APRIL 17, 1961

PAPER TRADE JOURNAL

Chemi-Mechano Pulping . . .
Past, present, future of ultra-high yield, fast growing methods, exclusive, begins in this issue.

Papelera Pulpa-Cuba . . . . .
Even the revolution did not stop this modern bagasse paper mill, writes ex-mill manager.

Spiral Conveyors . . . . . .
Old as Archimedes, require same great thought to erect, maintain.

Contents of the Week, pages 4-5

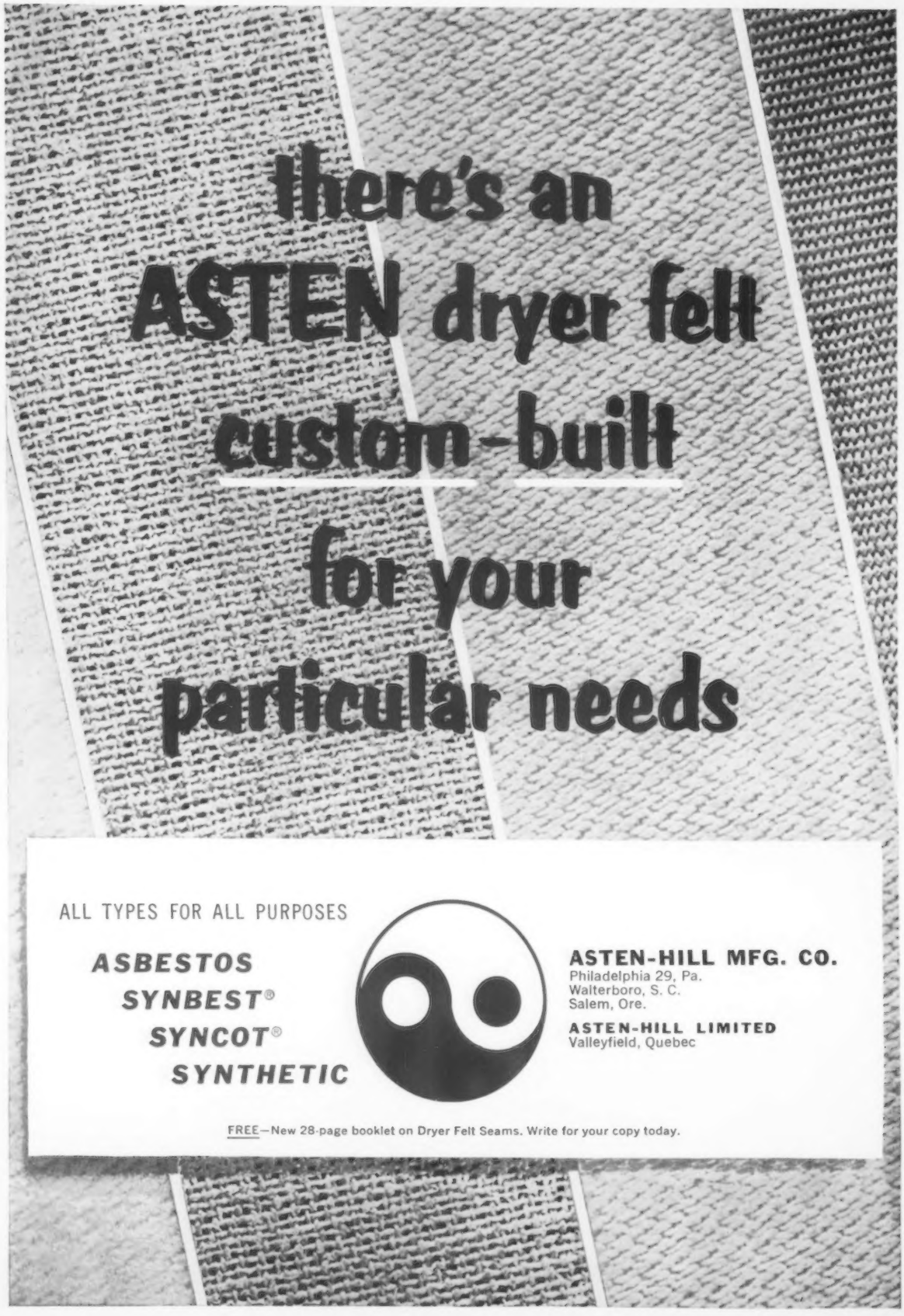
Editorial Dept.
University Microfilms, Inc.
313 N. First St.
Ann Arbor, Mich.

THE INDEPENDENT FIRM OF ENGINEERS HAS

THE UNDIVIDED PURPOSE OF REALIZING A LOW COST, HIGH EFFICIENCY OPERATION TO MEET YOUR RIGIDLY DETERMINED BUILDING NEEDS . . . AT AN ESTABLISHED FEE.

J. E. Sirrine Company offers professional engineering services . . . rendered in the sole interest of its clients.

J. E. SIRRINE COMPANY
GREENVILLE, SOUTH CAROLINA
A DEPARTMENTALIZED ENGINEERING ORGANIZATION SERVING • BUSINESS • COMMERCE • INDUSTRY
ENGINEERS SINCE 1902



ALL TYPES FOR ALL PURPOSES

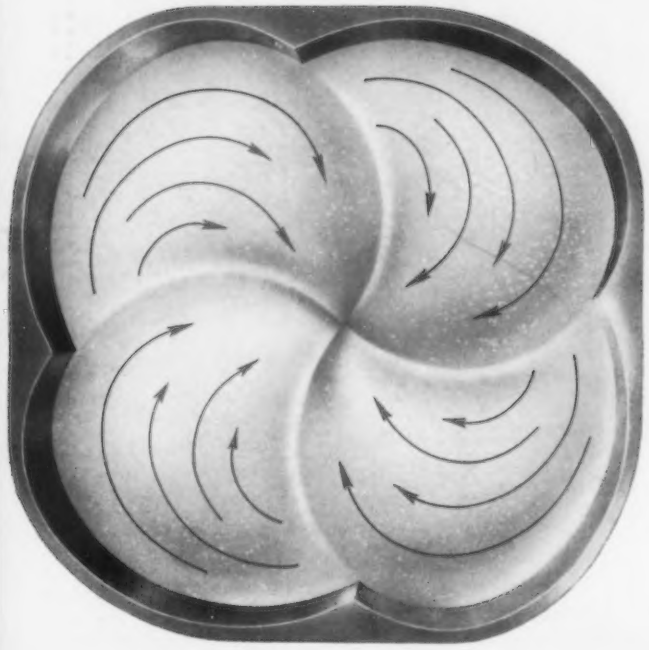
ASBESTOS
SYNBEST®
SYNCOT®
SYNTHETIC

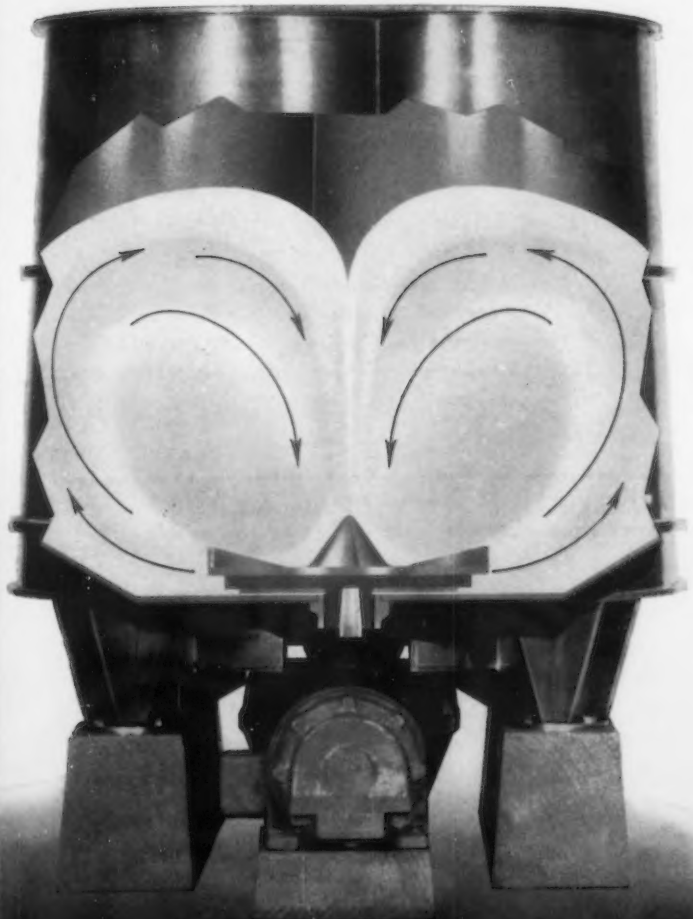
ASTEN-HILL MFG. CO.
Philadelphia 29, Pa.
Walterboro, S. C.
Salem, Ore.

ASTEN-HILL LIMITED
Valleyfield, Quebec

FREE—New 28-page booklet on Dryer Felt Seams. Write for your copy today.

8 BIG REASONS why mills choose the EMERSON TRIPLE ATTACK PULPER





1 FAST, UNIFORM DEFIBERING
Triple Attack pulping results from the (1) violent action of the impellor, which (2) forces stock against the lobe-shaped, tapered tub wall, which redirects it (3) against more onrushing stock coming from the impellor. No dead spots exist as fibers go through repeated cycles of contact with the impellor, tub wall and other fibers.

2 BOTTOM ROTOR
A heavy steel weldment body with 6 replaceable cast segments, each having a stainless steel vane, hard faced for wear resistance. Assures immediate pulp submergence and complete, uniform defibering, mixing or blending of full or partial charges.

3 BATCH OR CONTINUOUS PULPING
Batch pulping at 3% to 12% consistency. Continuous pulping at 2% to 5% consistency is accomplished by changing the extraction plates and adding a regulating box.

4 LOW POWER CONSUMPTION
HP is conserved by high consistency pulping — not wasted in circulating excess water.

5 FAST, CLEAN DUMPING
Short, direct connection is made between the sloped extraction chamber and outlet valve and pump. Simplifies piping installation. Extraction plate area speeds dumping and prevents foreign material from reaching pump and valve.

6 ENGINEERED FOR SERVICE
Unitized construction enables shipping entire unit in 1, 2 or 3 sections, match-marked for easy field erection. No joint leading necessary. Rugged, high alloy stainless or tile construction resists acids and chemicals in deinking or wet strength defibering. Five water jets in bottom section do thorough job of cleansing when necessary to change colors.

7 WET STRENGTH DEFIBERING
Triple Attack action breaks down wet strength furnishes in 40 to 45 minutes. Water temperature is easily raised by admitting live steam in the direction of stock flow through a tangential inlet at each of the 4 lobes of the tub.

8 PULPING VERSATILITY
Defibers, mixes or blends virgin pulps, bleached or unbleached sulphite, soda, Kraft, groundwood, news, waste papers, old corrugated, shoe board, milk cartons and all types of wet strength papers.

Emerson Triple Attack Pulpers are available in 9 sizes — from the 100 lb. laboratory or low tonnage model to the 8000 lb. unit — in carbon steel, several grades of stainless steel and tile. Complete information will be provided by getting in touch with our sales engineer nearest you or The Emerson Manufacturing Co., Division of John W. Bolton & Sons, Inc., Lawrence, Massachusetts.

BOLTON EMERSON
TRADE MARK

PAPER TRADE JOURNAL

Week of April 17, 1961
Vol. 145, No. 16

PUBLISHED WEEKLY SINCE 1872

JOHN C. W. EVANS
Editor

PAUL D. VAN DERVEER
Associate Editor

R. E. THUEMMES
Associate Editor

HARRY L. DYER
Assistant Editor

ERNEST F. BARKER
European Editor

L. HAMEL
Production Editor

WM. N. PERRY
Staff Artist

LOCKWOOD TRADE JOURNAL CO., INC.
49 West 45th Street, New York 36
Cable: Lockmin

GEORGE E. LOCKWOOD.....President and Treasurer
ARTHUR E. GORDON.....Vice President
FREDERICK E. WINKLER.....Secretary

Published by Lockwood Trade Journal Co., Inc., at 34 N. Crystal St., East Stroudsburg, Pa. Second class postage paid at East Stroudsburg, Pa. Printed in U.S.A. Copyright 1961 by Lockwood Trade Journal Co., Inc. Paper established Feb. 17, 1889, combined with Paper Trade Journal Nov. 16, 1899. Paper established Sept. 21, 1910, combined with Paper Trade Journal February 19, 1926. All rights to above titles reserved.

FEATURED THIS WEEK

Most Modern Bagasse Pulp and Paper Mill

In spite of delays in construction caused by the Cuban revolution, this integrated mill, Papelera Pulpa-Cuba, is now producing nearly every kind of paper—Sergio Martinez **20**

Chemi-Mechanical Pulping Processes—Past, Present and Future

Fast growing (notably cold soda) methods of producing ultra-high yield pulps are described. Processes, equipment, plants and uses are discussed and technical literature is reviewed in this extensive report about a most vital subject—A. Von Koeppen **24**

"Blacksmithing" of Screw Conveyors Only Increases Down Time

Proper selection and precise erection are very important procedures. After these are accomplished, their upkeep is simply reduced to lubrication, periodic replacement, cleanout, and painting—J. B. Green **32**

SUBSCRIPTIONS →

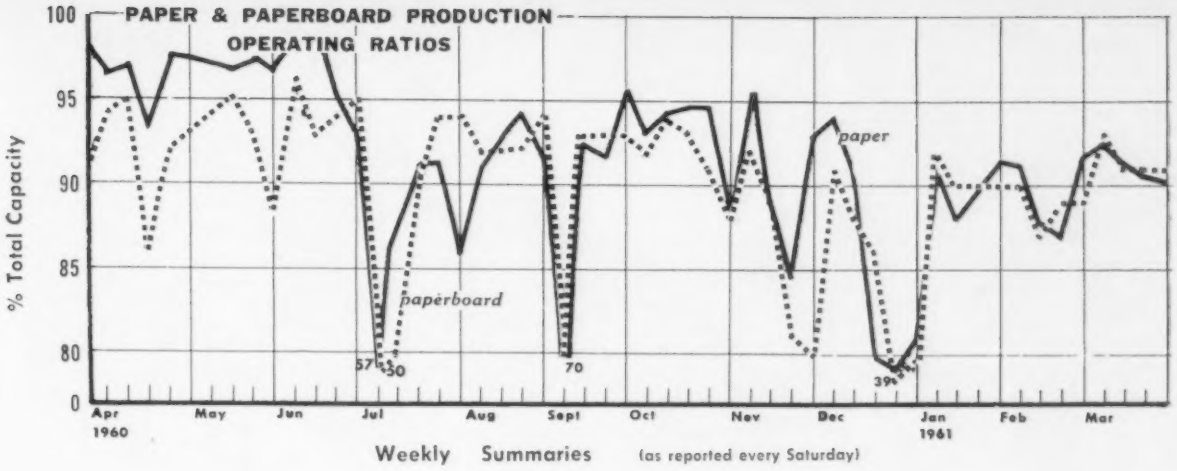
	1 yr.	2 yrs.	3 yrs.
Mills, Converters and Personnel U.S., Canada, Mexico	$5.00	$8.00	$10.00
Companies or persons not manufacturing or converting paper and pulp, U.S., Canada, Mexico	Per year: $7.50		
Latin American Countries	15.00	25.00	30.00
All Other Countries	20.00	30.00	40.00
United Kingdom Representative: J. B. Tratsart Ltd., 168A, Greenford Rd., Harrow, Middlesex, England	£7	£10/10	£14

Single copy price of current issue:
North America 50c Foreign $1.00
R. E. BOETSCH Director of Circulation

PAPER TRADE JOURNAL—49 W. 45th St., N.Y. 36, N.Y.
Please enter a subscription with the mailing address as follows:

Name .....
Address .....
City ..... Zone ..... State .....

If subscription is for an individual, please fill in:
Employer ..... City ..... State .....
Position ..... Employer's Business .....
Amount $..... ☐ Bill Me ☐ Bill Company ☐ Check Enclosed



Price Bros. Seeks Control of A.N.D. . . . Hammermill Plans to Purchase WNU Merchandising Facilities . . . K-C Awards Equipment Contract to Cherne Co. . . . Deinking Process to Get Full Scale Test . . . Lily-Tulip Cup and I-P Form New Company . . . . . **News of the Industry** *11*

Oxford Announces Management Changes . . . Ellen to Join Southern Land at New Mill . . . Boise Cascade Names Chief Chemist . . . Van den Akker Receives Fulbright Award . . . . . **Paper People** *13*

Western Corrugated Will Open Container Plant In Sacramento . . . Sheray Begins Production in So. Boston Plant . . . Tasker Joins PCA as R&D Director . . . American Tape Announces Change in Name . . . Harris Replaces Rowan at Doeskin Products . . . . . **News of Converters** *16*

Obituaries *18*

New Literature *41*

New Equipment & Supplies *42*

Prices of Fibers *47*

News of Suppliers *48*

Figures of the Week *52*

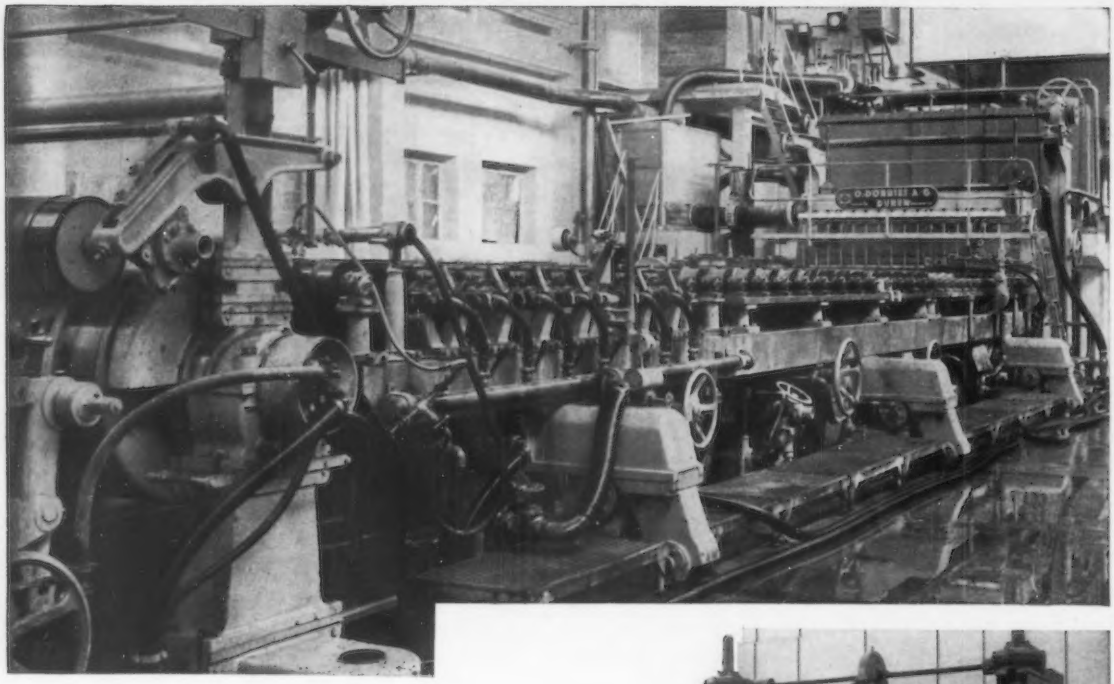
Classified Advertising *57*

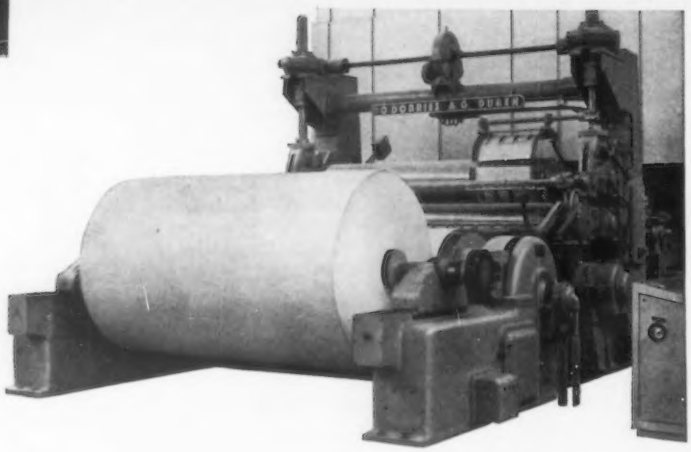
Advertisers Index *62*

REMEMBER THESE DATES

Technical Ass'n of the Pulp and Paper Industry, 12th Annual Coating Conference, Statler-Hilton, Buffalo, N. Y. **MAY 8-10**

Paper Industry Management Ass'n National Meeting, Robert Meyer Hotel, Jacksonville, Fla. **JUNE 7-9**





From the headbox to the reel

all construction facilities for an efficient production are fully employed and result in a very good end product at maximum capacity.

The machine is constructed for various grades of M. G. paper at a maximum speed of 300 m/min.

O. DÖRRIES A.G. DÜREN

Eisengießerei und Maschinenfabriken · Western Germany

Agents: Bulkey, Dunton Pulp Company, Inc. 295, Madison Avenue, New York 17 N.Y./USA
Telephone: Murray Hill 9-6400 Telex: TWY - NY 1 - 2092

JUST OFF THE PRESS . . . .

Twenty-seven valued articles all together . . . each written by an authority . . . offering solutions to various problems faced by the Industry's Orphan —FINISHING . . . comprising the initial phases of PAPER TRADE JOURNAL's exclusive "Operation Finishing." Order your personal copy TODAY! Price, only . . . $2.50 per copy

SOMETHING CAN BE DONE ABOUT

PAPER AND BOARD FINISHING

LOCKWOOD TRADE JOURNAL CO., Inc.
49 West 45th Street, New York 36, N. Y.

Please send me ..... copies of SOMETHING *CAN* BE DONE ABOUT PAPER AND BOARD FINISHING at $2.50 each, postage paid.

☐ Bill Company ☐ Check Enclosed

Name .....

Street ..... *City and State* .....

NERCO NIRO®

"GENTLE-IZED" **SPRAY DRYING**

converts spent sulphite liquor to marketable chemical by-products

Photos courtesy of Marathon, Division of American Can Co.

Marathon, Division of American Can Company, is showing the way to effective stream pollution control by turning its concentrated spent sulphite liquor into a dry product for industrial uses.

The new Nerco-Niro spray dryer at Marathon's Green Bay pulp and paper mill provides for 50 tons of finely powdered chemicals now being produced each day and sold under the trade name of "Norlig."

The "Gentle-ized" spray drying process produces a free-flowing granule of exceptionally high bulk density through use of a special atomizer wheel which was developed to cope with the liquor concentrate. Working as a team, Marathon and Nichols technicians conducted extensive trial runs at the Nerco-Niro laboratories. Based on the successful results of these laboratory investigations, the Nerco-Niro organization was chosen to proceed with the design and construction of the spray dryer shown.

The Nerco-Niro engineering staff is available for consultation concerning your specific problem whether it be research, testing, engineering or custom drying.

NERCO-NIRO SPRAY DRYER DIVISION

NICHOLS

ENGINEERING & RESEARCH CORPORATION

80 PINE STREET, NEW YORK 5, NEW YORK

SAN FRANCISCO **MONTREAL** **INDIANAPOLIS**

NEW-FOR COLORING PAPER IN THE PULP

STILBENE YELLOW 10 GP

Sized papers gain a premium look at budget prices

Dye lively canary and green shades with economy and satisfaction.

Reduce costs to new lows for bright yellows on commercial grades of bond, register, tissues, and wrapping papers. See the excellent color value and dyeing properties—light fastness comparable to other Stilbene Yellow types—nondusting.

Inquire how you can profit with this new direct dye and other GDC Stilbene Yellows in meeting your color requirements on sized papers.

Ask about—

STILBENE YELLOW TP CONC	economical reddish yellow
STILBENE YELLOW 3 GA CONC CF	slightly greener than Yellow TP Conc
STILBENE YELLOW 5 GXA	greener, brighter than Yellow 3 GA Conc CF
STILBENE YELLOW 6 GP	greener, brighter than Yellow 5 GXA
STILBENE YELLOW 8 GP	greener, brighter than Yellow 6 GP
DIRECT YELLOW CPA CONC	alkali-fast Stilbene types:
DIRECT YELLOW OPN	balancing colors for Paper Yellow 3 GXA

Call your GDC Technical Service Representative for complete information and samples or write us direct.

FROM RESEARCH TO REALITY

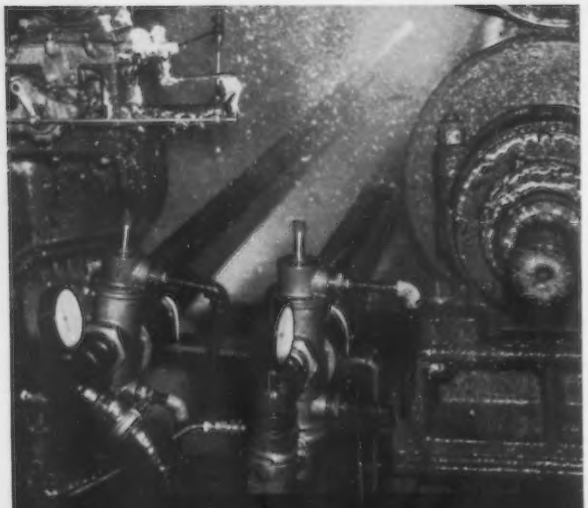
GENERAL DYESTUFF COMPANY

A DIVISION OF GENERAL ANILINE & FILM CORPORATION

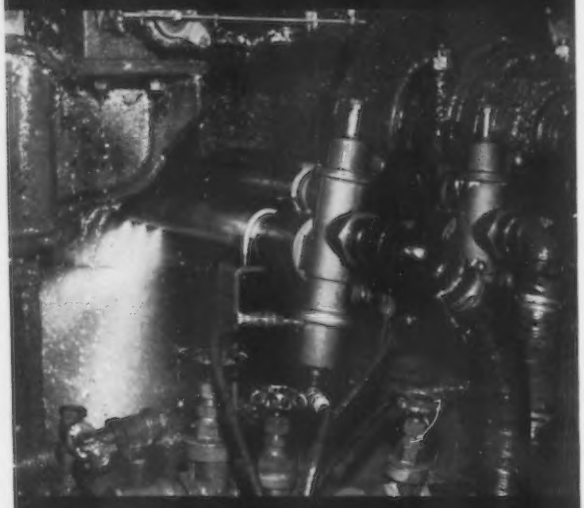
435 HUDSON STREET • NEW YORK 14, NEW YORK

CHARLOTTE • CHATTANOOGA • CHICAGO • LOS ANGELES • NEW YORK • PHILADELPHIA • PORTLAND, ORE. • PROVIDENCE • SAN FRANCISCO • IN CANADA: CHEMICAL DEVELOPMENTS OF CANADA, LTD., MONTREAL

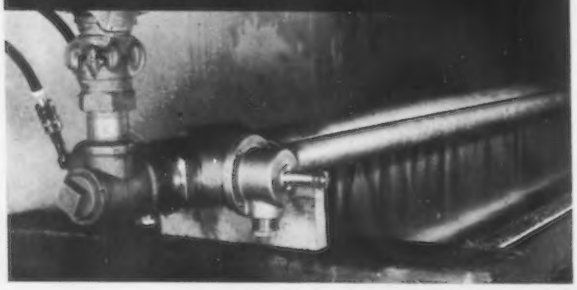
STILBENE YELLOW 10 GP, MANUFACTURED BY GENERAL ANILINE & FILM CORPORATION, IS SOLD OUTSIDE THE UNITED STATES AND CANADA UNDER THE TRADE NAME "FENAMIN YELLOW 10 G." BY DISTRIBUTORS ALL OVER THE WORLD.



Above and below—
Typical installation of two showers.



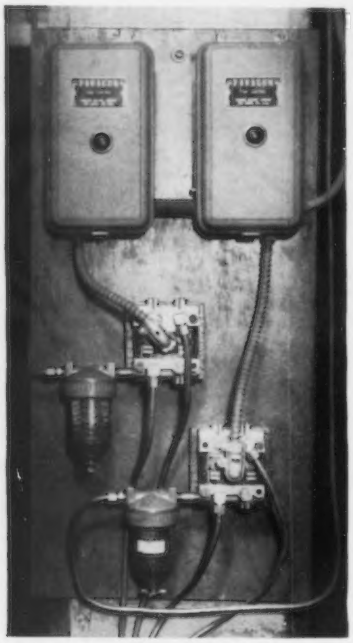
Below—
Shower operating on testing tank.
Note simplicity of hook up.



WE GUARANTEE

You can shower white water of any consistency with the new Broughton Self-Cleaning Showers.

Nozzles cannot stay plugged! With no manual attention, showers are cleaned at timed intervals, flushing all refuse into the drain.



Simple timing mechanisms for two showers mounted "out-of-the-way" on a column.

Extensive use in all sections of the country has induced comments such as **"a tremendous improvement," "the best we have ever used" and "absolutely trouble-free."**

Available with stationary or oscillating shower tubes and jet or fan nozzles.

Write for complete information—today!

A.E.Broughton & Co., Inc.

Glens Falls, New York Cable Address Broughtco Tel. RX 2-6541

Recognize these men? They're among the top executives, designers, chemists, and service and sales engineers who plan, edit and contribute to Albany Felt Company's FELT FACTS.

The experience and skills of these men are made available to the paper industry through this eight-times-a-year publication which has won the respect of papermakers everywhere.

Readers tell us they depend upon the authoritative information about paper machine felts detailed in FELT FACTS. This comes from the number of key men who participate in making this publication an informative, accurate, technical reference work. As such, FELT FACTS can and does assist papermakers in producing more tons per day, more days per felt.

Clockwise, by groups from left are: Laurence M. Woodside, Chief Eng., Tech. Field Services, and S. Stuart Engle, Tech. Director. John S. Sweet, Ass't. Chief Chemist; Carl C. Gordon, Chief Chemist, and Z. J. Chagnon, Div. V. President. Thomas O. Tietz, Adv. Mgr.; David F. McConaughy, Ass't. Chief Designer; W. S. Wightman, Ass't. Chief Designer; Harold F. Hedberg, V. President, Research, and James E. Smith, V. President and Gen. Mgr., Albany Felt Co. of Canada, Ltd. Samuel Van Praag, Sales Mgr.; Wayne G. Davis, V. President, Felt Sales, and James Garofalo, Service Eng.

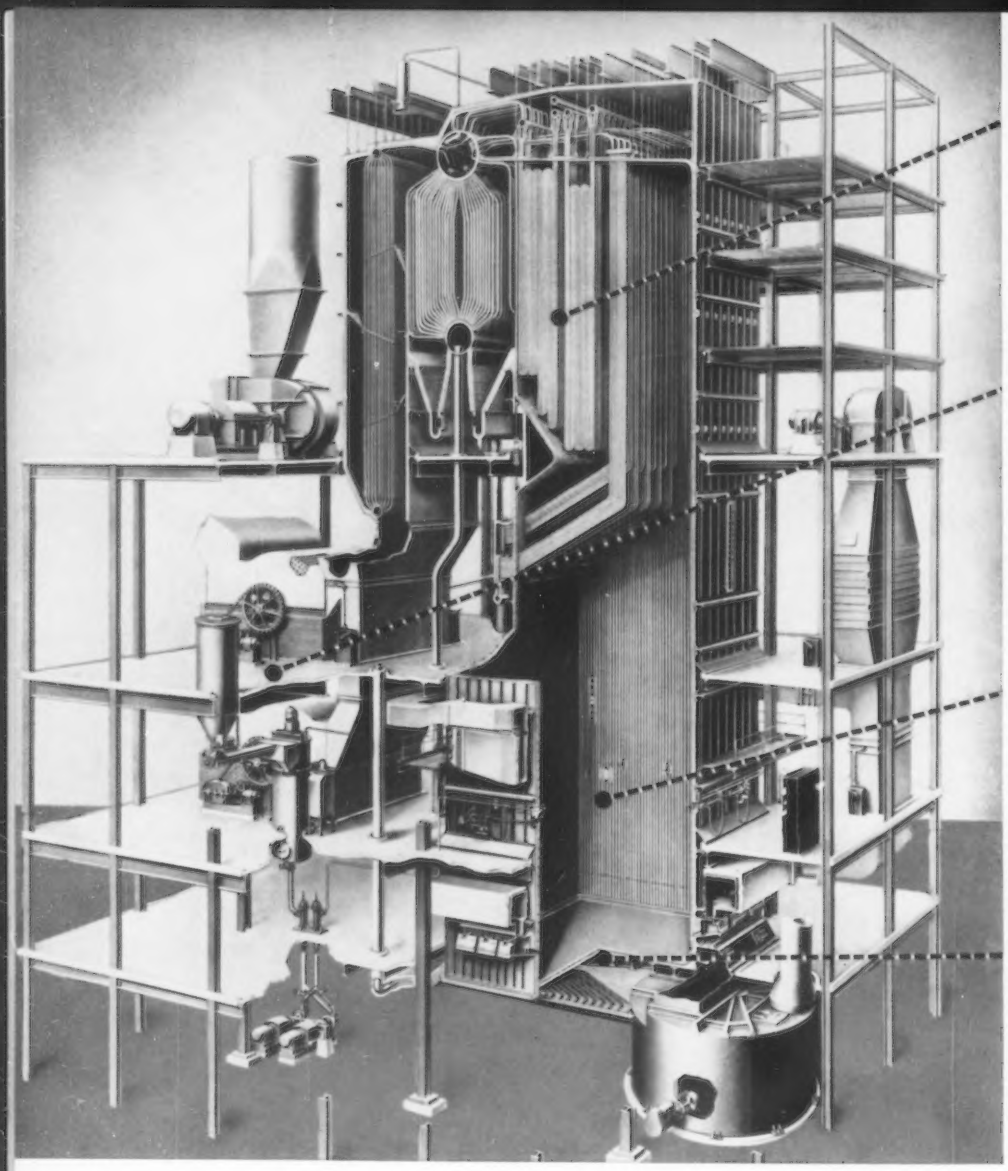
ALBANY FELT COMPANY
ALBANY, N.Y.

AF

Dedicated to Paper Industry Progress

N. Monmouth, Maine Hoosick Falls, N. Y. St. Stephen, S. C.
Cowansville, Quebec Cuautitlan, Mexico

TALK FELT FACTS WITH YOUR ALBANY FELT SALES ENGINEER



1. PANEL CONSTRUCTION

The widely spaced self-cleaning panel type superheater and screen — developed by C-E — provides no foothold for slag. Gas passage is smooth and unimpeded. Slag build-up is minimized, gas flow and heat absorption is uniform across the width of the furnace, surfaces are cleaner and soot blower action is more effective.

2. CONTROL

Furnace stability is assured because evaporative heat is controllable to compensate for density differences in incoming liquor, regardless of limited multiple-effect evaporator capacity. Liquor temperature is controlled accurately and automatically, and fuel-air ratios are automatically proportioned to maintain the furnace atmosphere required for high reduction.

3. TANGENTIAL AIR

Secondary air is introduced tangentially above black liquor sprays. Fuel-air mixture is intimate and complete. Gas velocity upward through the sprays is decreased, ash entrainment in gases leaving furnace is reduced. Combustion is completed in lower part of furnace, furnace exit gas temperature is reduced.

4. DECANTING HEARTH

A layer of chilled smelt is held in contact with the water-cooled furnace floor. Molten smelt rides on top of the chilled layer and leaves the furnace without touching hearth refractory or floor tubes. The cost and inconvenience of downtime due to hearth failure is eliminated.

Why "C-E" Means Economy in Chemical Recovery Systems

Until 1954, 350 to 400 tons was considered the size limit for chemical recovery units. Technical obstacles prevented bigger, more economical installations. Then, in October, 1954, C-E began taking orders for 500-ton units and larger! C-E breakthroughs had overcome the industry's "capacity barrier".

By combining the above four developments, a baffleless boiler and modern retractable soot blowers, C-E produced the first unit capable of handling 2,000,000 pounds of dry solids in 24 hours. This and a dozen similar giants are far exceeding expectations, so great are their economies.

You can benefit from this extensive experience—by working with C-E on your chemical recovery problems. Call the C-E office nearest you, or contact the C-E Paper Mill Division in New York.

COMBUSTION ENGINEERING

Combustion Engineering Building • 247 Madison Avenue, New York 16, N. Y.

CANADA: Combustion Engineering-Superheater Ltd.

C-247

ALL TYPES OF STEAM GENERATING, FUEL BURNING AND RELATED EQUIPMENT; NUCLEAR REACTORS; PAPER MILL EQUIPMENT; PULVERIZERS; FLASH DRYING SYSTEMS; PRESSURE VESSELS; SOIL PIPE

PAPER TRADE JOURNAL

WEEK OF APRIL 17, 1961

Price Bros. Seeks Control of A.N.D.

It has been reported that Price Bros. & Co., Ltd., is negotiating with Associated Newspapers, Ltd., for interest in Anglo-Newfoundland Development Co., Ltd. Associated Newspapers, Ltd., holds a controlling interest in Anglo-Newfoundland.

The negotiations concern an offer by Price Brothers to acquire on the basis of a share exchange, the whole of the issued share capital of the Anglo-Newfoundland Development Co., other than shares held by residents of the United States.

1961 newsprint capacity of Price Bros. is 505,629 tons; and Anglo-Newfoundland Development Co., 284,040. Gaspesia Sulphite Co., Ltd., subsidiary of Anglo-Nfld., plans to build a newsprint mill in Chandler, Que.

Hammermill Plans to Purchase WNU Merchandising Facilities

Donald S. Leslie, president of Hammermill Paper Co. of Erie, Pa., and Farwell W. Perry, president of Western Newspaper Union of New York City, have announced that their respective companies have concluded an agreement, subject to certain tax rulings, which provides that Hammermill Paper Co. will purchase all of the wholesale paper merchandising facilities and related operations of Western Newspaper Union. These operations will continue to be carried on by Hammermill Paper Co. under the Western Newspaper Union name.

Western Newspaper Union has other facilities used in manufacturing and printing operations which are not included in the sale to Hammermill.

Western Newspaper Union has been a distributor of Hammermill products for over 50 years. Its present wholesale paper operations include 19 sales offices and warehouses located in 12 southern, southwestern and midwestern states with annual sales of approximately $17,000,000. Payment will be made by Hammermill in cash and common stock. The purchase price was not disclosed.

K-C Awards Equipment Contract to Cherne Co.

Kimberly-Clark Corp. has awarded the general contract for installation of a new high-speed coated printing paper machine and auxiliary equipment at its Niagara, Wis., mill to the Cherne Co., Inc., of Ironwood, Mich.

Work is to start immediately and the contract calls for late 1961 start-up of the 170-inch machine and related equipment, company officials said. Construction of a 100,000-square-foot mill addition is in progress and is expected to be complete by late spring. The addition will house finishing room and warehouse facilities.

Deinking Process to Get Full Scale Test

A two-month full-scale production test of paper manufactured with the use of reclaimed waste paper will be started at the Manistique Pulp & Paper Co. plant in July.

Fran S. Hoholik, plant manager, said about 6,000 tons of newsprint will be made in the production test.

The plant, owned by Feld Enterprises, Inc., Chicago, has been experimenting in production of newsprint through use of a revolutionary flotation process. The process, which does away with the need for chemical fiber additives and sharply cuts costs, recovers the chemical fiber in magazine-type papers.

Construction of Southern Land Ga. Mill to Begin

Southern Land Timber & Pulp Corp., with plans for a $42 million pulp and paper mill near Cedar Springs, Ga., for production of linerboard and newsprint, reports that the first stage of mill construction will begin in a few weeks, according to a report from the American Newspaper Publishers Association.

E. L. Cowan, executive vice president for Southern Land, said that newsprint users will be particularly interested in the fact that our machine building is being constructed not only to house the initial linerboard machine, but also to provide space for a newsprint machine on which we expect to begin work as soon as the first stage of mill construction is complete late next year. We are also providing space for a grinder room and other facilities needed for the early production of quality newsprint.

Lily-Tulip Cup and I-P Form New Company

The Lily-Tulip Cup Corp. and the International Paper Co. have announced the formation of a new company, the Red River Paper Mill, Inc., at Springhill, La.

The jointly owned mill will manufacture bleached paperboard for the parent companies. The pulp will be supplied by an International plant near by.

EEC Establishes External Duties on Newsprint

Common external customs duties for newsprint have been agreed upon by the Council of Ministers of the European Economic Community.

The rates, published December 31, 1960, are as follows: Paper for newspapers, 7 per cent; paper for periodicals, 16 per cent (admission subject to conditions to be determined by the competent authority).

N.P.T.A.'s OFFICIAL FAMILY for 1961—(left to right) Glenn Leach, executive secretary; Charles E. Canfield, treasurer; Gardiner Young, vice president for industrial papers; William F. Obear, president, and Rolland R. Whiteman, vice president for printing papers.

TAPPI Coating Conf. Program Announced

R. W. Martinek, Kimberly-Clark Corp., general conference chairman, has announced the final details of the program for the TAPPI 12th Coating Conference scheduled for Monday-Wednesday, May 8-10, 1961, at the Statler Hilton Hotel, Buffalo.

The theme of this conference is "Adhesives for Coating," and the technical program was prepared under the direction of C. G. Whelpton, Champion Paper & Fibre Co. The official banquet will be held Wednesday noon with A. G. Sharp, executive vice president of Kimberly-Clark Corp., speaking on the subject of "Opportunities Unlimited."

MONDAY, MAY 8—SESSION I

Opening Remarks: R. W. Martinek, Kimberly-Clark Corp., general conference chairman.

Moderator: J. T. Goodwin, Jr., Corn Industries Research Foundation, Inc., Washington, D. C.

1. "Adhesion of Fibrous Materials"—J. J. Bikerman, Massachusetts Institute of Technology.

2. "Some Theoretical Aspects of Adhesion"—T. Alfrey, Dow Chemical Co., Midland, Mich.

3. "Future Coating Trends"—M. R. Castagne, Pulp & Paper Magazine, New York, N. Y.

4. "Pre-Cast Coating—A New Process and a New Product'—F. Bergstein, Interstate Folding Box Co.

SESSION II

Moderator: A. W. Neubauer, Crown Zellerbach Corp., Camas, Wash.

5. "Some Techniques for the Assessment of Coated Art Papers"—I. F. Hendry, Wiggins Teape, Research & Development, Ltd., Beaconsfield, Bucks, England.

6. "Coating of Paper in Germany"—M. Judt, Feldmuhle Papier—und Zellstoffwerke Aktiengelsellschaft, Hillegossen, Germany.

7. "Starch Requirements for Paper Coating"—A. Harsveldt, Nationale Zetmeelindustrie N. V., Veendam, Holland.

8. "Rheology Properties and Flow Modifiers for Trailing Blade Coatings"—J. F. Hern, Nopco Chemical Co., Harrison, N. J.

TUESDAY, MAY 9—SESSION III

Panel Symposium — "Adhesives for Coating."

Moderator: R. T. Trelfa, Perkins-Goodwin Co., New York, N. Y.

Panelists:

Dr. F. Frost, S. D. Warren Co., Cumberland Mills, Me.—Enamel Papers.

F. Kaulakis, Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis.—Publication Papers.

R. H. Mosher, Kimberly-Clark Corp., Neenah, Wis.—Specialty Papers.

J. T. Loomer, Continental Can Co., New York, N. Y.—Board.

W. P. Taylor, The Champion Paper & Fiber Co., Hamilton, Ohio—General Comments on Adhesive Developments.

WEDNESDAY, MAY 10—SESSION IV

Moderator: J. D. Wethern, Riegel Paper Co., Acme, N. C.

9. "The Evolution of Coating Preparation in a Bleached Paper Mill"—R. W. Bondurant and K. E. Bradway, Union Bag-Camp Paper Corp., Franklin, Va.

10. "An On-Machine Double Coating Process"—M. V. Merchant, Container Corp. of America, Brewton, Ala.

SESSION V

Moderator: H. H. Lavery, International Paper Co., Corinth, N. Y.

11. "Cationic Latex with Controllable Penetration and Set-Off Properties"—E. J. Heiser, A. S. Reder and R. W. Morgan, The Dow Chemical Co., Midland, Mich.

12. "The Preparation of High Solid Casein Coatings"—H. K. Salzburg, L. E. Georgevits, and W. L. Marino, The Borden Chemical Co., Bainbridge, N. Y.

13. "The Use of Polyvinyl Alcohol as a Color Coating Adhesive"—G. P. Colgan, and J. J. Latimer, Air Reduction Chemical & Carbide Co., Bound Brook, N. J.

14. "A New Resin Emulsion for Preparation of Greaseproof Coatings"—A. D. Jordan, Jr., Rohm & Haas Co., Philadelphia, Pa.

COATING COMMITTEE MEETING

C. G. Landes, U. of North Carolina, chairman—(Open to Members and Guests).

Pulp and Paper Ass'n. Formed in India

An all India Seminar on Small Scale Pulp and Paper Manufacture was held at Dalmianagar (Bihar) March 18-20 and was attended by experts from all over the country.

At the meeting attended by about 200 representatives, the formation of an association, to be known as the Indian Pulp and Paper Association, was given shape with the enrollment of some 60 members on the spot. An executive council was also formed. Named to the post of chairman was F. C. Michael, managing director, Titaghur Paper Mills Ltd.; the president is V. Podder, Works Director, Rohtas Industries, Ltd.

Paper and Paperboard Production

The American Paper and Pulp Association reported the ratio of the United States paper production to mill capacity for the week ending April 1, 1961, at 90.2 per cent, compared with 91.1 per cent, revised, for the preceding week. The ratio was 97.9 per cent for the corresponding week a year ago.

The National Paperboard Association reported the paperboard production ratio for the week ending April 1, 1961, at 91 per cent, compared with 91 per cent for the preceding week and 91 per cent for the corresponding week a year ago.

(Detailed Statistics on page 52)

PAPER PEOPLE

T. E. Bruning

G. H. Scott

Oxford Announces Management Changes

B. F. Ayer

Oxford Paper Co. management changes have been announced by William H. Chisholm, president.

Theodore E. Bruning has been elected vice president, finance, Oxford Paper Co. He joined Oxford in 1928 as cashier and has successively held the positions of auditor, controller, assistant treasurer, treasurer, and has been vice president and treasurer since 1953.

Gorham H. Scott, assistant to the president, has been elected a vice president of Oxford. He is also vice president of the Rumford Falls Power Co., an Oxford subsidiary. Mr. Scott has been employed by the company since graduating from Bowdoin College in 1929, working in Portland, Me., until 1957 and since then in the company's New York offices.

B. Frederick Ayer has been elected treasurer of Oxford. A graduate of Northeastern University and Bentley School of Accounting, he joined the company in 1942 and has held the positions of assistant treasurer and then treasurer of the Rumford Falls Power Co. Since June 1 he has been assistant treasurer, Oxford Paper Co.

Ellen to Join Southern Land at New Mill

Bruce P. Ellen has been appointed production manager of a new mill planned by the Southern Land, Timber and Pulp Corp. for Cedar Springs, Ga., the company announced.

Mr. Ellen is now general superintendent of the Port Wentworth plant of Continental Can Co. near Savannah. The new mill is scheduled to commence operations in late 1962, Southern Land said.

Agler to Retire from St. Regis Cointainer Div.

St. Regis Paper Co. announces the retirement of Robert W. Agler as president of its Container Division, effective April 1. Mr. Agler joined St. Regis in 1955 when General Container Corp. of which he was president, was merged into St. Regis Paper Co.

Mr. Agler had served as president of General Container since 1944. Prior to that time he practiced for many years as a certified public accountant in Cleveland, Ohio.

Mr. Agler received the degree of Bachelor of Arts from Ohio Wesleyan University and attended the Harvard Graduate School of Business Administration.

Boise Cascade Names Chief Chemist

Newell Emery has been named to the newly created position of chief chemist of Boise Cascade Kraft Corp.

Mr. Emery is transferring to Wallula from Berkeley, Calif., where he has been technical director of Boise Cascade Corp.'s multi-wall bag plant, Ames Harris Neville Co. Prior to joining Boise Cascade in the summer of 1959, he was employed by Scott Paper Co. in its Everett and Anacortes mills.

He received his college training at the University of Maine from which he received his bachelor of chemical engineering and master of science in pulp and paper technology degrees.

J. A. Van den Akker

Van den Akker Receives Fulbright Award

J. A. Van den Akker, senior research associate and chairman of the department of physics and mathematics at the Institute of Paper Chemistry (Appleton, Wis.), has been invited by the University of Manchester, England, to be a lecturer in physics during the 1961-62 academic year, and has been granted a Fulbright award for this purpose.

Beginning October 1, Dr. Van den Akker will present at the University a series of lectures and seminars on the physics of paper, dealing with the theory and phenomena relating to paper's physical and optical properties. The appointment will end April 1, 1962.

Dr. Van den Akker has made significant contributions to research on the structure and properties of paper.

A. J. Aycock

Con. Can Names Asst. Superintendent at Augusta

Albert J. Aycock has been appointed to the position of assistant superintendent-paper mill at the Continental Can Co. bleached kraft paperboard mill at Augusta, Ga.

Mr. Aycock, who most recently was employed by Riegel Paper Corp. at Acme, N. C., also obtained broad papermaking experience with East Texas Pulp and Paper, Silsbee, Tex., St. Regis Paper Co., Jacksonville, Fla., and International Paper Co., Springhill, La.

Mr. Aycock, who is a native of California, started his paper mill experience in the Springhill plant of International Paper Co.

Lorenson Joins Sales Staff of Chesapeake Corp.

Norman O. Lorensen has been appointed to the sales organization of The Chesapeake Corp. of Virginia, according to a recent announcement by C. J. Topping, Chesapeake's manager of board and paper sales.

Mando Names Saari Mgr. Industrial Relations

Appointment of O. H. Arnold Saari, as manager of industrial relations for The Ontario-Minnesota Pulp and Paper Co., Ltd., has been announced. Mr. Saari began his duties at Fort Frances March 17.

With 15 years of experience in labor relations and personnel management fields, Mr. Saari comes to Mando from a position as industrial relations manager for the Janitrol divisions of Midland-Ross Corp. at Columbus, Ohio. He previously was director of personnel at the Minneapolis works of Minneapolis-Moline Co. Mr. Saari succeeds W. J. Windebank, who has accepted a position with another paper company.

A.N.D. Announces Staff Changes

The following staff changes have been announced by Anglo-Newfoundland Development Co., Ltd., Grand Falls, Newfoundland.

D. J. Griffin, formerly assistant superintendent—orders and shipping department, has been moved to the position of assistant superintendent of mill stores.

Kevin M. Harvey formerly assistant superintendent—mechanical department, has been moved to the position of acting superintendent of the orders and shipping department.

James Hall, formerly general foreman in the orders and shipping department, assumes the position of acting assistant superintendent of this department.

W. E. Spearin

D. M. Bare Advances Spearin to Plant Manager

The D. M. Bare Paper Co., Roaring Spring, Pa., has announced the promotion of Walter E. Spearin to the position of plant manager.

Mr. Spearin joined Combined Locks Paper Co., of which the D. M. Bare plant is a subsidiary, in 1949. In 1954 he was employed by the U. S. Government, and in 1956 he returned to the company as production superintendent at the Roaring Spring mill.

He graduated from the University of Maine and served in the U. S. Army during World War II. Prior to joining Combined Locks, he did graduate work at The Institute of Paper Chemistry.

St. Croix Fills Newly Created Posts

Appointment of William T. Gallagher as personnel director and Robert E. Jones to the post of staff public relations has been announced by the St. Croix Paper Co.

W. E. Henricks

Mead Advances Five At Chillicothe Division

Promotion of five management and production employees at The Mead Corp.'s Chillicothe Division and the retirement of E. B. Brundige as production manager have been announced.

Warren E. Henricks has been named assistant division manager; Mason Hinkle, production manager, paper machines; William Berthold, production manager, finishing, shipping, specialty products; John Carson, production manager, conversion coating; and Booker Bunch, production manager, pulping and chemicals.

Mr. Henricks, prior to this promotion, had been an administrative assistant to H. H. Wheeland, division manager, for more than a year. Mr. Henricks, a member of the first group of engineering trainees hired by Mead, joined the company in 1947 immediately following graduation from the University of Illinois where he had received a B.S. degree in mechanical engineering.

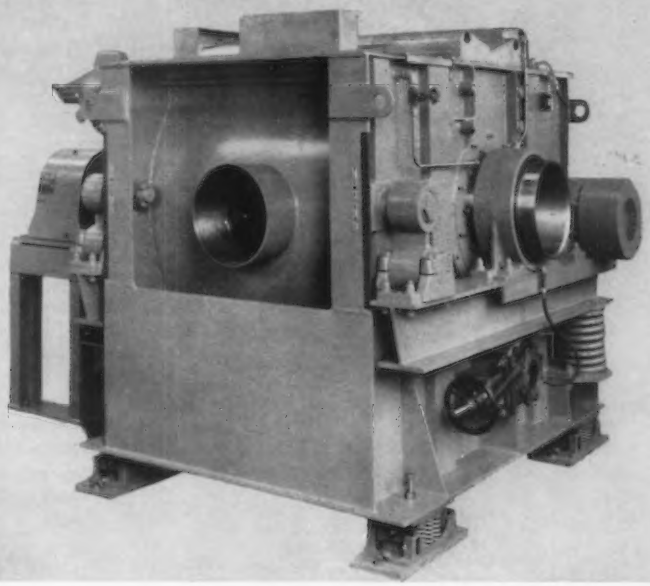
At the completion of his training program, he was named assistant to the maintenance supervisor, and subsequently became assistant master mechanic. In 1950 he was promoted to assistant division engineer and six years later was named division engineer.

Mr. Hinkle joined Mead in 1925. Most recently he has been assistant production manager, paper machines. Mr. Berthold came to Mead in 1929 in the technical service department. he has been assistant production manager, finishing and shipping, since 1956.

Mr. Carson was first employed by Mead as an assistant in the technical control laboratory at the Dill & Collins Paper Co. in his home town of Philadelphia. Since February 1960 he has been assistant production manager, conversion coating. Mr. Bunch, associated with Mead since

You can do a whale of a lot of slotted plate screening in small space at low screening cost per ton with

BIRD VIBROTOR SCREENS



For example, air dry tonnage:

	through .014″ slots	.012″	.010″
Unbleached sulphite	65 tpd at 1.6%	55 tpd at 1.5%	46 tpd at 1.5%
Bleached sulphite	82 tpd at 1.7%	68 tpd at 1.6%	57 tpd at 1.7%
Unbleached sulphate	75 tpd at 1.7%	58 tpd at 1.6%	
Bleached sulphate	80+tpd at 1.9%		
Deink paper stock		100+tpd at 1.9%	75 tpd at 2.2%
	through .035″ slots	**.024″**	**.018″**
Semi-chemical board	150 tpd at 1.6%	100 tpd at 1.5%	86 tpd at 1.7%
	through .020″ slots		
Board filler	110 tpd at 2.0%		

Ask us to send you the new Bulletin on the Vibrotor Screen, or to furnish layouts and estimates.

BIRD MACHINE COMPANY

SOUTH WALPOLE, MASS.

REGIONAL OFFICES: EVANSTON, ILLINOIS
PORTLAND 4, OREGON • ATLANTA 9, GEORGIA

Canadian Manufacturers of Bird Machinery
CANADIAN INGERSOLL-RAND COMPANY, Limited, Montreal

graduation from Lynchburg College in 1945, since February has been assistant production manager, pulping and chemicals.

The retirement of E. B. Brundige as division production manager concluded a Mead career which had spanned the last 39 years, all of which had been at the Chillicothe Division.

C. H. Hornsby, Jr.

Bowaters Carolina Names Groundwood Supt.

Clarence H. Hornsby, Jr., has been named groundwood superintendent for Bowaters Carolina Corp. He was formerly employed as assistant pulp mill superintendent by International Paper Co. at Pine Bluff, Ark.

Mr. Hornsby is a native of Alabama and earned his B.S. degree in Engineering at Auburn University.

Columbia River Names Mgr. For Dallas Sales Office

Herbert G. Lemon, formerly with Provincial Paper, Ltd., in Toronto, Canada, has been appointed manager of a new sales office for Columbia River Paper Co. in Dallas, Texas. According to Robert Noyes, Jr., sales manager for the Portland based firm, the Texas office, located in the Braniff Building, is part of the company's expansion program better to serve the western and southwestern states.

Mr. Lemon, who has 32 years experience in the field of paper sales and manufacturing, will head the fifth western sales office to be opened by Columbia River. Other offices are located in Portland, Ore.; San Francisco and Los Angeles, Calif.; and Denver, Colo.

Columbia River Paper Co. produces a complete line of printing papers, including safety paper. Its mills are located in Salem, Ore., and Vancouver, Wash., with executive offices in Portland.

PJT NEWS OF CONVERTERS

Western Corrugated Will Open Container Plant In Sacramento

Western Corrugated, Inc., of San Leandro, Alameda County, Calif., will open a Sacramento plant for the manufacture and multi color printing of corrugated shipping containers about May 1. Roy F. Fefley, president, said the plant will make finished boxes for a variety of agricultural and industrial products produced in the Sacramento region and surrounding territories.

The facility will employ 25 persons at the outset and will produce about one million containers a month.

"Our objective," Mr. Fefley said, "is to provide faster and more efficient service with quality containers for the growing Sacramento area, particularly to the east and south of Sacramento area, and to the east and south of Sacramento itself."

Harry Fialer, former sales representative in Western Corrugated's plant in San Leandro, will be general manager of the Sacramento unit. Larry Alameda will be plant superintendent.

The firm is a major producer of corrugated packaging in Central California. Its San Leandro plant employs 150 persons and is capable of manufacturing more than 250,000 containers a day.

Western Corrugated is affiliated with the Western Kraft Corp. of Portland, Ore., a fully integrated manufacturer of pulp, paper and corrugated shipping containers with mills and container plants in the three Pacific coast states.

Sheray Begins Production In So. Boston Plant

The Sheray Corp., a new converter of paper tubes, cores, and spools, has begun production in its new manufacturing plant in So. Boston, Mass.

Formed exclusively by engineers in 1960 to manufacture tubes completely by automation, Sheray took over one year to design and construct a new type of automated machinery before accepting its first order.

Sheray is the first new converter in New England in 15 years and the only one with completely custom and automatic equipment to build tubes.

Sherman Wolf, president, and Ray Lobisser, treasurer, stated that with this equipment not only should they be able to build tubes at a faster rate than the trade has known in the past, but also be in a very favorable competitive position.

The company expects to solicit not only the regular tube business but will build special machinery for new and troublesome customer applications and will concentrate on precision tubes and cores for the adding machine roll, gummed tape, fuse industries, etc.

Donald A. Lindahl well known sales executive in New England, has been named sales manager.

Tasker Joins PCA As R&D Director

Clinton W. Tasker has joined Packaging Corp. of America as director of technical research and development.

J. L. Wilson, vice president, research and development, announced that Dr. Tasker's office will be located in Grand Rapids, Mich.

Dr. Tasker formerly was with the Film Division of the American Viscose Corp. at Fredericksburg, Va. He has 19 years experience in the cellulose, chemistry, and film processing fields, and is a graduate of Syracuse University. He received his doctorate at McGill University.

American Tape Announces Change in Name

American Pres-Stix Tape Co. is the new name for the former American Tape Co., it was announced by Chris Kurzweil, president of the Michigan-based firm.

The change is part of an expansion program in which regional offices are being established throughout the country. The new company name has been taken from the manufacturer's trade mark, Pres-Stix.

The American Pres-Stix Tape Co.,

Just out! a definitive book about calender rolls

From the *world's largest specialty roll shop* comes this informative 32-page book. Far more than a catalog, it provides a great deal of information needed for intelligent selection and maintenance of calender rolls. It is divided into sections as follows:

THE COMPLEXITIES OF DESIGN
This chapter deals with the various aspects of roll design as affected by the individual application. Written in collaboration with Farrel engineers it discusses thoroughly such subjects as type of material, temperature control, procedure for determining roll crown, etc. Required reading for buyers and engineers.

ROLL MANUFACTURE
If you've ever wondered what type of facilities and machinery go into the making of fine calender rolls, this section should be illuminating. Casting, machining, grinding and final testing operations are described in concise language, dramatically illustrated.

CARE AND MAINTENANCE
Maintenance men will benefit from the material given here. Tells you how to preserve the initial precision of Farrel rolls and considers factors like handling and storage, calender operation and lubrication. Discusses roll failure . . . pitting, spalling, denting, scoring and so on . . . and suggests possible causes.

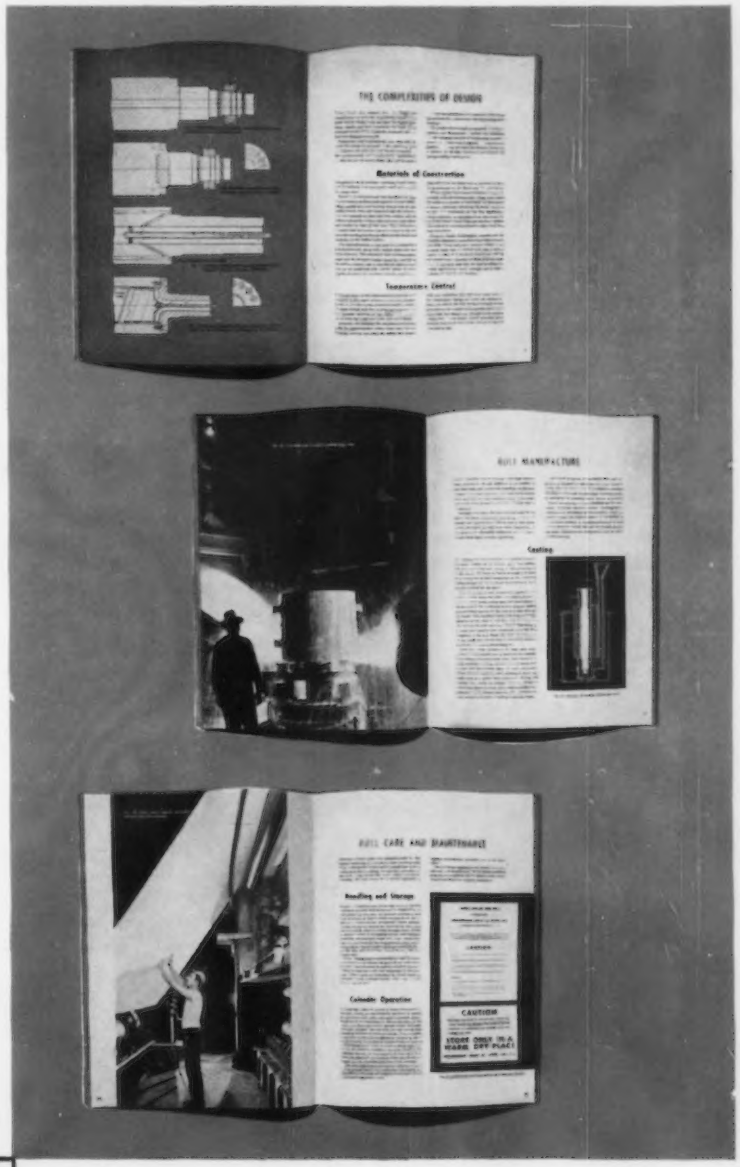
Simply ask for bulletin 123.

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONNECTICUT

Plants: Ansonia and Derby, Conn., Buffalo and Rochester, N. Y.

Sales Offices: Ansonia, Buffalo, Akron, Chicago, Los Angeles, Houston, Atlanta

European Office: Piazza della Republica 32, Milano, Italy



FARREL®

WRITE NOW... a gold mine of roll information at no cost!

FB-1212

with general offices in Port Huron and sales headquarters and testing laboratories in Detroit, is Michigan's only manufacturer of pressure sensitive products for industry and retail trade. The company was established in 1953.

Harris Replaces Rowan At Doeskin Products

Morton J. Harris has been promoted to general manager of the Utica Division of Doeskin Products, Inc.

He takes the place of Howard Rowan, former general manager who recently left the organization to take a similar position with Steiner Tissue Mill of Albany, N. Y.

Doeskin maintains two additional locations; one at Rockland, Del., and one at Clayville, N. Y. Mr. Harris has been associated with the Clayville and Utica plants since 1948 when he came to Utica from New York City, as office manager of the Utica plant. Since that time he has held the position of production superintendent, plant accountant, assistant general manager, and director of planning and control.

Wagner Van Vlack

Milprint Fills Newly Created Position

Wagner Van Vlack has been appointed to the newly created position of vice president and marketing division general manager for Milprint, Inc., the country's largest printer and converter of flexible packaging materials. Milprint, Inc., is a subsidiary of Philip Morris, Inc.

In his new position, Mr. Van Vlack will be responsible for overseeing the firm's marketing program including market research, merchandising, advertising, project planning, field operations and Milprint's specialists in industry sales.

Prior to joining Milprint, Inc., Mr. Van Vlack was field sales manager for the American Can Co., with which he had been associated since 1935. In 1955 he was appointed vice president of American Can International, Inc., and two years later was promoted to assistant to the president of American Can Co. In 1958 he was named field sales manager.

General Fibre Box Names Reiniger Vice President

W. Q. Reiniger has been elected a vice president and director of the General Fibre Box Co., of West Springfield, Mass. He had been associated with the company's parent organization, Longview Fibre Co. for about 30 years and most recently as general manager of Longview's Los Angeles box plant.

Holbrook Joins American Viscose Sales Force

Frederic R. Holbrook has joined the New York district sales office of American Viscose Corp.'s Film Division as a sales trainee.

A native of New York, Mr. Holbrook attended the University of Mexico and graduated from the University of Virginia with an A.B. degree in foreign relations. He has had experience in packaging and sales work and previous to joining American Viscose was a technician and expediter of production for Shellmar de Colombia in Medellin, Colombia, S. A.

HEAVIER, DENSER

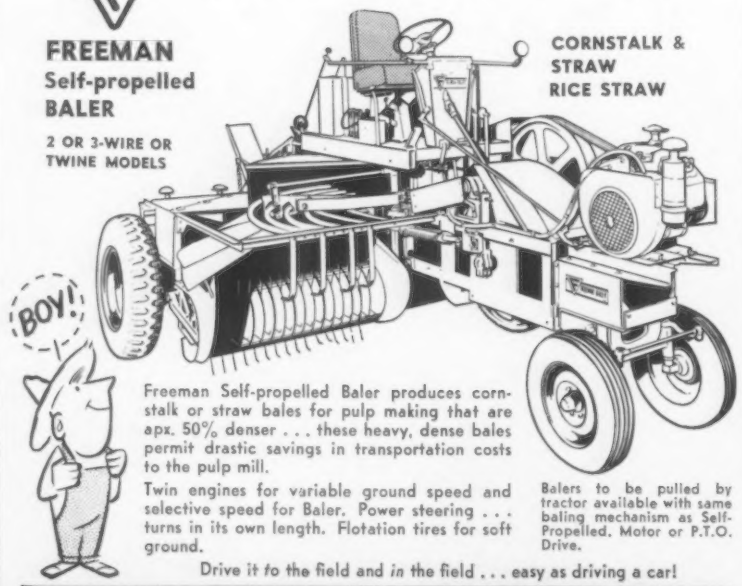
BALES for PULP MAKING

REDUCE HAULING COSTS

FREEMAN
Self-propelled
BALER

2 OR 3-WIRE OR TWINE MODELS

CORNSTALK & STRAW
RICE STRAW



Freeman Self-propelled Baler produces cornstalk or straw bales for pulp making that are apx. 50% denser . . . these heavy, dense bales permit drastic savings in transportation costs to the pulp mill.

Twin engines for variable ground speed and selective speed for Baler. Power steering . . . turns in its own length. Flotation tires for soft ground.

Balers to be pulled by tractor available with same baling mechanism as Self-Propelled. Motor or P.T.O. Drive.

Drive it *to* the field and *in* the field . . . easy as driving a car!

J. A. FREEMAN & SON
2034 N. W. 27th Avenue
PORTLAND 10, OREGON

OBITUARIES

J. D. Dooley, 54, regional sales manager of International Paper Co.'s Southern Kraft Board Division, died suddenly in Chicago on March 31.

A veteran of 34 years with the company, Mr. Dooley was born in Crossett, Ark. He joined International Paper at the company's mill in Bastrop, La., in 1927.

Herman Gilman, 66, secretary of the Gilman Paper Co., died March 28 at his home in New York City.

Mr. Gilman who had been with the firm for more than 50 years, sold newsprint and specialty papers in the United States and Canada.

FINISHED PRODUCT PROCESSING EQUIPMENT Winders • Reclaim Winders • Cutters • Slitters • Supercalenders • Roll Wrappers • Roll Lowering Tables • Roll and Shaft Handling Equipment • Conveyors • Unwind Stands and Tru-Tension Controls • and other equipment for the paper and allied industries.

before you decide on a new **supercalender**

meet some "Beloit Eastern" people

JOCZ applies know-how of nearly 25 years' experience with tool design and exacting problems of paper mills.

PRAGER sparks new ideas based on his 35-year background in finishing and converting end of paper industry.

IMPROVEMENTS IN NEW MODEL SUPERCALENDER are reviewed by Dan G. Jocz, manager of manufacturing (*left, below*), and George Prager, design engineer. Blueprint shows equipment specially designed for physical setup of customer's mill. Machinability and strength factors are highlighted. Planer mill in background is part of Beloit Eastern's battery of diversified machine tools at Downingtown, Pennsylvania.

RESULT: mill will get peak of supercalender design . . . new production standards.

PHOTOS: T. H. CHRISTENSEN

BELOIT EASTERN PAPER MACHINERY DOWNINGTON, PENN.

Member Beloit Group

BELOIT EASTERN CORPORATION

Downingtown, Pennsylvania

Control slime the new, effective, low-cost way

Just this much C2® slimicide for a ton of pulp!

- Newsprint
- Unbleached, semi-bleached and bleached kraft
- Food and paper board
- Printing and book papers

EFFECTIVE. Extensive mill use proves conclusively that C2, the new Mathieson slimicide, is the most effective product for acidic white water systems. Only ¼ pound of C2 per ton of pulp (often even less) is a common dosage rate for rapid, sustained control. Actual cost per ton: about 10-20¢. Resultant action: continuous generation of chlorine dioxide throughout the white water system . . . a distinct advantage over other slimicides which function only near point of application.

Other C2 advantages: no foaming at the head box . . . will not darken pulp . . . will not affect dyes at recommended dosage rates.

EASY-TO-USE. C2 is readily soluble in water and is non-corrosive to equipment.

C2 is shipped in highly-soluble, dry-flake form in quantities from one-pound samples to 100-pound drums in truckloads and carloads. Also, 50% solution is supplied in tank cars and trucks.

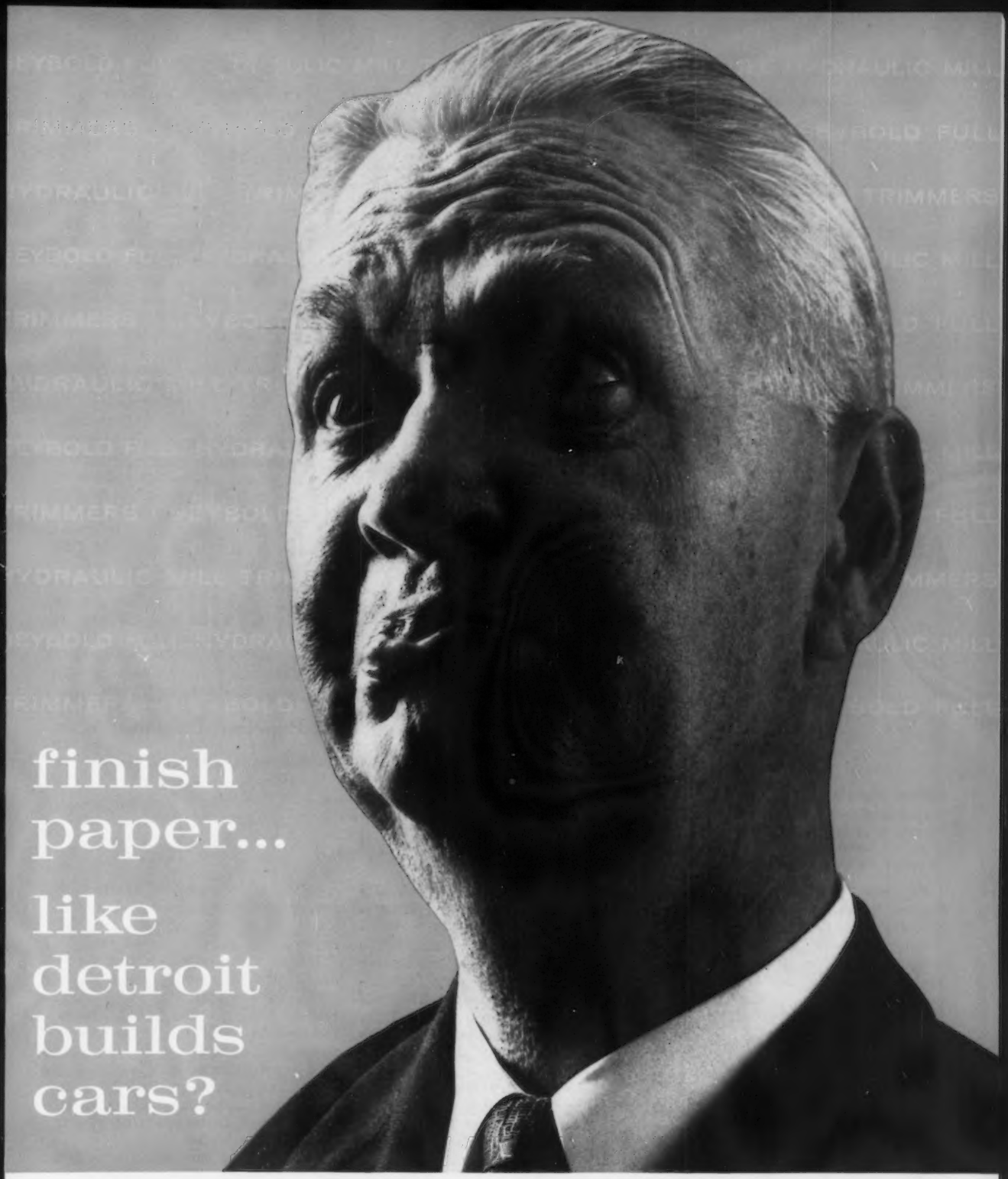
FDA CLEARANCE. C2 is our trademark for sodium chlorite. The Food And Drug Administration has expressed the opinion that this chemical is not a food additive when used as a slimicide as it cannot reasonably be expected to become a component of food through this use.

See C2 work in your mill—call for a demonstration.

Olin Mathieson, Baltimore 3, Maryland

CHEMICALS DIVISION Olin

164



A lot of mills are doing it. Right now. With mechanization. They're streamlining material flow. Using air-film tables, for instance . . . conveyors, lifts and Seybold Full Hydraulic 65," 85" and 100" mill trimmers—the only full hydraulics. They're cutting costs—boosting tonnage. The figures are fantastic. So much so, you'll never believe them if we quote them. So join us on a plant tour . . . write today.

HARRIS INTERTYPE CORPORATION

HARRIS-SEYBOLD A Division of Harris-Intertype Corporation

4538 East 71st Street, Cleveland 5, Ohio

NEW MILL AT IZNAGA, CUBA

Most Modern Bagasse Pulp and Paper Mill

In spite of delays in construction caused by the Cuban revolution, this integrated mill, Papelera Pulpa-Cuba, is now producing nearly every kind of paper.

Sergio Martinez,
Project Engineer
Parsons & Whittemore*

Papelera Pulpa-Cuba, S.A., started its new bagasse pulp and paper mill at Iznaga, Cuba, late in 1959 and was in full production by June, 1960. This is probably the most modern integrated sugar cane bagasse pulp and paper mill in the world from the point of view both of the design and the efficiency of the equipment.

The final decisions on the type of mill, the process to be used and the selection of the equipment to be installed were made only after a long period of intensive study of the technical and economic problems involved in building a bagasse pulp and paper mill in Cuba. During all these preliminary phases of the project, as well as during the execution phases, the staff of Papelera Pulpa-Cuba received technical cooperation from the Parsons & Whittemore Organization of New York. A world leader in the planning and design of mills to produce pulp and paper from locally available fibers, Parsons & Whittemore assigned experts in agricultural fiber pulping to study the Cuban mill project and render the technical advice necessary for successful pulping of bagasse. The final detailed design of the mill and the supervision of its construction was then carried out by the local mill staff.

In spite of delays brought on by the Cuban revolution, construction of a completely integrated mill was finished two years after the initial contract was concluded, and operation of the pulp mill was begun. A few months later the paper mill went into operation.

Diversified Production

The pulping of bagasse is accomplished by the soda process with a slight sulphidity for some grades of pulp. The digestion of the bagasse is carried out in a four-tube Pandia continuous digester. No chemical recovery system was installed at the start but the original plan calls for its eventual addition to the plant.

Pulpa - Cuba makes practically every kind of paper except newsprint. In the fine bleached field, it makes bond, tablet, book, mimeo, lightweight board, etc. In the coarse paper field, it makes multiwall, liner and corrugating medium. The amount of bagasse pulp used varies, depending on the paper being made, and amounts to as much as 90 per cent in some grades.

It was found that paper with 100 per cent bagasse fiber could be made without any difficulty. However, due to the slower drainage of bagasse fibers, it was necessary to lower the speed of the machine and consequently the production. It was found more profitable to add a small percentage of long fiber pulp to obtain greater machine speed and higher daily production.

*Mr. Martinez was formerly mill manager, Papelera Pulpa-Cuba, S.A.

The quality of the papers obtained has been excellent comparing favorably with all papers of equivalent grades on the market.

Depithing

The bagasse used at the pulp mill is obtained from the nearby Trinidad sugar mill. It was decided at the very beginning of the project that to obtain a good grade of pulp, the maximum amount of pith should be removed from the bagasse. In order to accomplish this in the most economical manner, a large depithing installation was needed at the sugar mill.

Before the bagasse could be diverted to pulp production from its former use as fuel in the sugar mill, the old bagasse boilers had to be removed and replaced with two modern oil-fired boilers. Two of the old boilers were kept to burn the pith.

No difficulty was encountered in burning the pith. The combustion was quite satisfactory in the old bagasse boilers as long as enough air was supplied from underneath so that the pith would burn in suspension. The efficiency obtained was quite satisfactory and compared favorably with that obtained burning whole bagasse.

In operating the two modern, oil-fired, water wall boilers, it was found that the amount of oil needed to substitute for the bagasse was very close to the theoretical value of two barrels of fuel oil for every ton of bone dry bagasse.

The total quantity of bagasse coming from the sugar mill tandems is passed through two Parsons & Whittemore "Horkel" depithing machines.

The separated pith goes directly to the converted boilers, and the separated fiber goes to three rotating drums where the remaining loose pith is separated and also sent to the boilers. The humidity of the separated pith and fiber was found to be nearly the same as that of the incoming whole bagasse. In other words, the moisture content of the whole bagasse was divided between pith and fiber in proportion to their respective oven dry weights. The pith was actually burned in the boilers with a moisture of nearly 50 per cent.

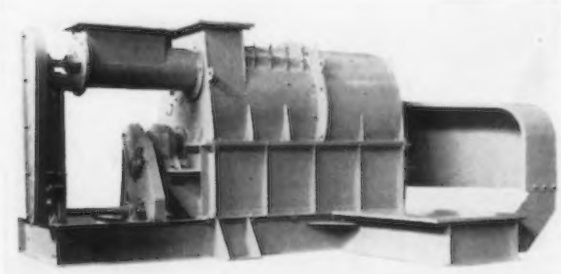
The depithed bagasse fibers go to two high density baling machines of the most modern semi-automatic type. It was decided to use galvanized wire for baling in order to prevent rusting. The added investment for this wire has proven its worth in eliminating troublesome iron oxide from the baled bagasse.

An extra "Horkel" unit and an extra baler were installed to provide stand-by capacity in case of trouble in the regular lines. This insures that sugar mill operation will not be disturbed.

Bagasse Storage And Handling

During the sugar cane grinding season, (about 120 days), the depithed bagasse is used at the pulp mill within a few hours after leaving the sugar mill. There has been no difficulty at all in processing when using fresh bagasse, compared to old bagasse. As a matter of fact, the operation of the pulp mill is much better when using fresh bagasse during the grinding season and the overall efficiency is slightly higher. The baled excess bagasse produced daily at the sugar mill is stored in big piles of about 1000 tons each.

Experiments were carried out to determine whether the cost of covering such piles was worth while or not. It was found that in Cuba, the use of asphalt coated galvanized panels, of a type used in Louisiana, was prohibitive in cost. However, a roof constructed directly over the piles by means of leaves from the palm trees proved to be very economical and perhaps even better than the galvanized panels, since it provides ventilation of the piles. The use of this type of roof is now standard at the Cuban mill. Assuming that the galvanized panels have a life of six years, the total cost for covering the piles with galvanized sheets would be 55 cents per ton of oven dry bagasse, including labor and material. Actually, the cost would probably be higher, since after only one



Horkel depither is a modified swing hammer mill. Revolving hammers knock pith free, then drive pith through perforated metal plate at bottom. Depithed fiber passes out through housing to rotating drums.

Diesel powered crane handles bales for both stacking and unstacking. Six men are needed beside crane operator.

Special grab handles twelve bales. Six inch air spaces are left between each group of twelve bales.

Four tube digester is designed for capacity of 60 tons per day. Mill operates with cooking time of 12-14 minutes for white papers, less for unbleached stock.

year of use they were already rusting. Allowing a life of three years for a palm tree roof, the total cost of labor and material per oven dry ton of bagasse was only 36 cents.

In a pilot study, it was found that bales in uncovered piles deteriorated on the outside but only in the upper layers of bales. In the outermost layer, deterioration extended in only about 10 inches on the exposed side. The first layer of each pile was damaged to a large extent whether or not the piles were covered. A decision whether to cover the piles, and if so with what materials, is strictly an economic matter that will vary for each different country and mill location.

At Pulpa-Cuba, the bales are handled, for both stacking and unstacking, by a Diesel powered crane, equipped with caterpillar treads and 70 ft. long boom. A special grab handles 12 bales at a time. The piles are made leaving air spaces of six inches between each group of 12 bales. Only six men besides the crane operator are needed for handling the bagasse bales during these operations. During the grinding season, this crew can stack all of the excess bales from one day of cane grinding in nine hours. In the off season, the stored bales for one full day of pulp mill operation can be unstacked in seven hours.

The whole storage area is carefully graded so as to provide natural drainage during heavy rains. A railroad system was laid with tracks between every two rows of piles, but no roadways were built since they were not necessary and would only serve as obstruction for the easy movement of the crane. The whole area is equipped with an up-to-date hydrant system, backed with an automatic fire pump. The only additional requirement from the fire insurance company was to keep the piles at a maximum size of 1000 tons of oven dry bagasse per pile, and to keep the separation between piles at no less than 70 ft. end to end and 120 ft. side to side.

Bales of bagasse are taken from storage to the pulp mill by narrow gauge railroad cars which are loaded with 90 bales per car by the crane. A sufficient number of cars are loaded during one shift to provide bagasse for all three shifts in the pulping operation. The cars are unloaded on a covered platform beside the pulp mill. The chopped and depithed bagasse is carried from the unloading platform by bucket elevator to a pre-impregnator just ahead of the digester.

Pulp Mill Operation

After a comprehensive study of all digestion systems available, a Pandia continuous digester was selected for pulping the bagasse. The decision was based on satisfying the needs of pulp quality, control of cooking conditions, minimum building space, and low investment cost. The pulp obtained from this system is of a very uniform quality; yield is high, and steam requirements are low. The consumption of raw material, steam and power, and liquor is quite uniform.

The four-tube digester is designed for a capacity of 60 short tons per day, but provisions were made so that it can be increased to 110 short tons per day by simply adding two more tubes and an additional screw feeder. The conveyors, elevators, feeders, liquor handling equipment, etc. were all designed for 110 tons per day and were all constructed locally.

Black liquor is added to the bagasse in a pre-impregnator from which the material is screw fed to the Pandia digester. Fresh liquor consisting of 14 per cent caustic soda is added just ahead of the first tube. A normal cook for white papers would require 14 per cent caustic and cooking temperature of 340°F. In some cases sodium sulfide was included in the cooking liquor and was found beneficial to pulp quality, but has since been abandoned for economic reasons.

It was found that the fast cook provided by this equipment was quite satisfactory and gave a pulp of very high quality. Consequently, the mill has been operating regularly with a cooking time of between 12 and 14 minutes in the production of pulp for white papers. For unbleached stock a cooking time of 10-12 minutes has been found sufficient. There was no difficulty with the operation of the digester after the operators were properly trained. It was found that the operation was quite simple and that the conditions could be varied as required.

The cooking conditions (time and per cent caustic) vary considerably depending on the type of pulp being produced. The permanganate number is as low as nine, when making high quality bleached pulp for extra fine papers and as high as 30, when making high yield pulp for corrugated medium.

For the operation of the complete Pandia system, including control of the feeding conveyors, pre-impregnation, control panel, sampling, liquor preparation, and control of auxiliary equipment, only one skilled operator and one helper are needed per shift.

For washing it was decided to use only two stages in the beginning, but provision was made for a third stage when the recovery plant is installed. For cleaning the pulp, two stage rotary screens and three stage centrifugal cleaners are used.

The bleach plant is a standard three stage bleachery: chlorine, caustic and hypochlorite. The washers are standard rotary vacuum type with the first stage washer being of rubber covered construction. All towers are made of steel, lined with special tiles. A 40 ton capacity high-density tower is installed after the bleachery, to provide storage of bleached pulp. Pulp brightness of 80 is easily obtained and the control is quite accurate including oxidation, potential, pH, residual chlorine, etc. All the control consoles and panel-

boards were designed and constructed locally.

Stock Preparation

Two systems are provided to allow mixing of virgin wood pulp or waste kraft stock with the bagasse pulp, but actually only the waste kraft system has been found necessary. Each system includes a Hydrapulper, cleaners, decker and chest.

For the preparation of the pulps, disc refiners and jordans are provided that can be switched to either of the systems, depending on the paper being made. A proportioning system is provided to mix the pulps accurately and also to proportion size, clay, alum and colors.

Paper Machine

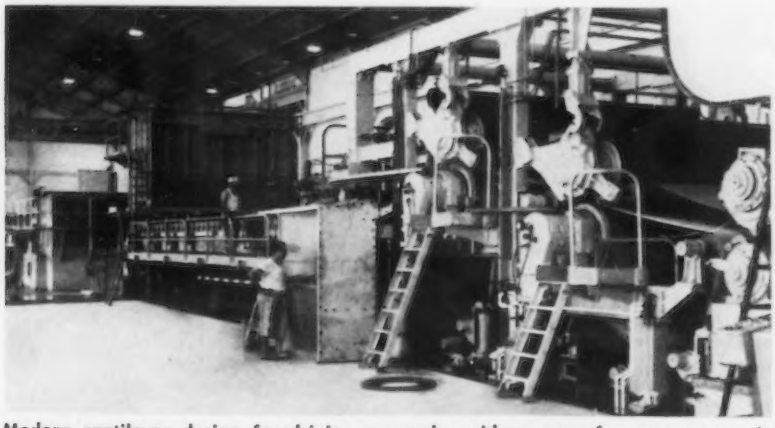
The fourdrinier paper machine, supplied by the Black-Clawson Co., is of the most modern cantilever design and can make a wide range of papers. This versatility is necessary to supply the Cuban market demand for many different grades of paper.

The machine has an open headbox with a long fourdrinier, followed by two straight through suction presses and a smoothing press. The fourdrinier is equipped with double shake, dandy roll and eight suction boxes. Its cantilever design permits rapid complete wire change.

The wire is 162 inches wide by 100 feet long and runs at speeds up to 1500 feet per minute, depending on the type of paper being made. In spite of the slow drainage characteristics of bagasse fibers, this length of wire was found ample enough. The mesh used was 70 x 52 for fine papers and 60 x 40 for unbleached grades.

The dryers, all 60 inches diameter, are arranged in four sections. Between the first and second sections there is a breaker stack, and between the third and fourth sections there is a vertical size press. Two sets of calenders are provided ahead of the reel. The drive is sectional electric, with the main generator driven by a high pressure steam turbine.

The machine winder can run up to 4500 feet per minute and is equipped with a hydraulic table for lowering the finished rolls to the operating floor. The drive for this winder incorporates a modern electric regenerative control.



Modern cantilever design fourdrinier can make wide range of papers to supply Cuban market demand for many different grades.

Machine has four dryer sections, vertical size press, two calender stacks. Breaker stack is located between first and second dryer section.

Steam and Power Plant

Since the mill is located in an isolated area, a complete steam and power plant was installed, capable of supplying all the steam and electricity needed for the initial installation of equipment, as well as for future installations.

The steam plant consists of three 52,000 lbs. per hour package boilers, operated at 425 psig and 750°F. Normally only two boilers are needed and the third is kept as a spare. The installation is so arranged that a fourth boiler can be added in the future when the load increases to a point when three boilers will have to be operated simultaneously. Complete auxiliary equipment was supplied, including Zeolite water softener and pressure filters for the make-up water, deaerator, feed water pumps, fuel oil pumping and heating equipment, and internal boiler treatment equipment.

The power plant consists of two 2500 kw. turbo generators, equipped with surface condensers and automatic extraction at 150 psig. The average total electric load with the whole mill operating was 4000 kw. leaving more than 1000 kw. for future expansion.

Auxiliary Installations

The water supply is obtained from a nearby river and a complete coagulation and clarification plant was installed capable of handling 4600 gpm of water. The average hardness of the river water is 150 p.p.m. This value is brought down to about 90 p.p.m. in the treatment plant. The incoming turbidity is over 1000 during the rainy season, but the outgoing turbidity is always kept at a value of less than 10.

For the effluent water, a seven miles long underground pipe was installed in order to carry the contaminated water by gravity to a lagoon near the sea coast.

The mill is equipped with complete shop facilities, such as machine shop, welding shop, instrument shop, electric shop and carpenter shop, as well as the necessary auxiliary building for offices, warehouses, and living quarters for mill personnel.

First Complete and Authoritative
Survey of Newest Pulping Methods

Chemi-Mechanical Pulping Processes — Past, Present and Future

Fast growing (notably cold soda) methods of producing ultra-high yield pulps are described. Processes, equipment, plants and uses are discussed and technical literature is reviewed in this extensive report about a most vital subject.

A. von Koeppen,
Associate Research Professor,
Western Michigan University,
Kalamazoo, Mich.

During the last ten years a considerable amount of work has been done in U.S.A. and overseas for the development of high yield chemi-mechanical pulps from local hardwoods.

Chemi-mechanical pulps are defined by Chidester (1) as "pulps produced from wood in any form or shape, by using a mild chemical treatment in which there is no major change in lignin, followed by a mechanical treatment to separate the fibers. Usually these pulps fall within the yield range of 80 to 95 per cent."

This yield is considerably higher than that obtained in production of chemical and semi-chemical pulps and is closer to the yield obtained in groundwood pulps. Because of availability and for economical reasons, most of the chemi-mechanical processes are based on hardwoods rather than on softwoods. Hardwoods are usually cheaper than softwoods; many of them being denser than softwoods and therefore giving a higher amount of pulp per cord of wood at the same yield.

There are numerous articles and pamphlets published in U.S.A. and overseas stressing the importance of better utilization of hardwoods (2, 3, 4, 5).

The limited supply of coniferous species and the abundance of broadleaved species in South America, Australia, and the Pacific area are well known. Therefore, new ways for the utilization of the abundant hardwood species had to be developed, which also had to be economical in order to compete with the existing groundwood, chemical, or NSSC pulps. A comparison of the quality of the existing chemi-mechanical pulps with commercial groundwood and chemical pulps is summarized in the next part of this series.

It is the author's opinion that the existing NSSC process has not yet successfully solved the problem of hardwood utilization, due to the difficulties in recovery of the spent liquor, high bleaching cost, and stream pollution. There is a wide open field for the use of hardwood pulps produced by different chemi-mechanical processes (cold soda, chemi-groundwood, Stora-Brite, etc.).

The recent development in cold soda pulping is a good example for these new pulping trends. With conventional pulping processes, (kraft, sulphite, NSSC, groundwood) growing slowly but steadily, the cold soda pulping was subject to a remarkable growth. Commercial production of cold soda pulp started four years ago at the Gould Paper Co., Lyons Falls, N. Y., and production of this type

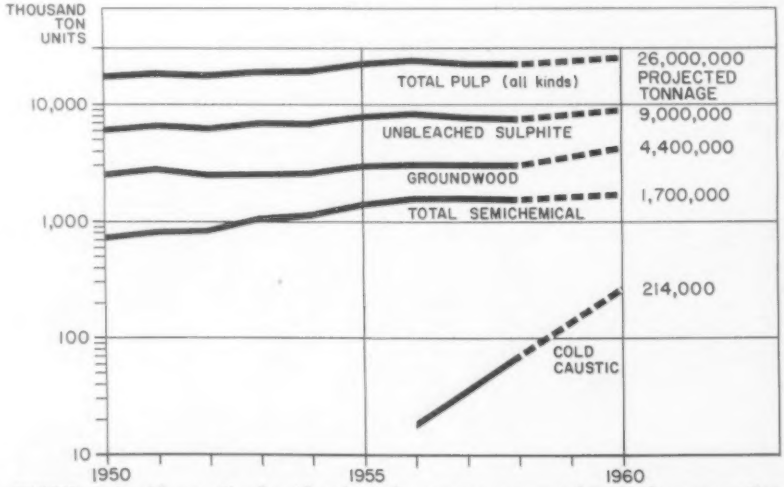


FIGURE 1: Rapid growth of cold soda pulp process compared to U. S. consumption of other pulp grades (6).

ABOUT THE AUTHOR

Andreas von Koeppen was born in Petersburg, Russia. After obtaining his degree in chemical engineering he obtained first-hand experience working as foreman and later as assistant production manager in sulphite mills in Russia and Germany. After the war he started his postgraduate studies, first at the Technical University Graz, Austria, and then at the Technical University Darmstadt, Germany. After receiving his "Dr.-Ing." (Ph.D. with Engineering Degree) in 1948 in Darmstadt he spent five years working as research officer at the Forest Products Laboratory, Melbourne, Australia, on the utilization of tropical woods for pulp and papermaking. Moving to the United States five years ago, he started work on chemi-mechanical processes as project leader in charge of the pulping and bleaching group in Covington, Va. Later on he obtained an industrial-sponsored Research Professorship at Western Michigan University from the Packaging Corp. of America, American Box Board Division. He was instrumental in consulting and development work for the existing cold soda mill at Filer City, Mich.

of pulp in the U.S.A. was about 214,000 tons in 1960 (See Figure 1). The total annual capacity for the U.S.A. and overseas is estimated by the author to be approximately 387,000 tons for 1961.

Debarking of Hardwoods

It is a recognized fact that wood used for the production of bleached chemi-mechanical pulp should be properly debarked and be of a good quality. Only in some exceptional cases where unbleached pulp is used (e.g. for 9-point board) bark can be tolerated.

Visitors to different mills will find a wide variety of debarking methods, machinery, and quality of results. Operation in the woodroom is a compromise between quality, cost and quantity of production. To obtain dirt-free chips, bark, cambium layer, dirt and knots have to be removed from the hardwood logs. This results in a considerable amount of handling, increased cost and decreased yield per cord. The kraft process can tolerate much more bark and dirt particles than sulphite, groundwood or chemi-mechanical processes.

Experience shows that when starting a new chemi-mechanical operation, integrated with a kraft or NSSC mill, proper care should be taken for the selection and debarking of hardwoods. For bigger chemi-mechanical installations, integrated or non-integrated with kraft or NSSC mills, special debarking or even a special woodroom is very desirable.

There are four major debarking principles used in U.S.A. and Europe:

1. Friction barker

a. Drum barkers where wet and dry processes are used.

b. Pocket barkers.

The difference between wet and dry barking is mainly that in wet barkers wood is sprayed with a considerable amount of water, while in dry barkers no water is used. Pocket barkers are using a wet barking technique.

2. Knife barkers

There are at least a dozen different knife barking systems widely used in U.S.A. and Europe.

3. Hydraulic barkers (Karlstrom and Allis-Chalmers stream barkers, Bellingham, etc.).

4. Combination of drum and hydraulic barkers (Schoengau).

These debarking systems are very thoroughly described in Klemm's book "Mechanical Pulp Manufacture" **(7)**. The increased cost of wood and labor had caused a tendency towards the wood and labor saving friction barking equipment, using the "mass barking" principle. In modern times, knife barking pays off only when the quality requirements of the pulp are high. But the newest high capacity knife barkers developed by Impco in U.S.A. and Cambio in Sweden, and also the Schoengau process developed in Germany presents a challenge to the drum barkers widely used in North American and Scandinavian countries.

It is a recognized fact that drum barkers successfully applied to coniferous species do not perform satisfactorily on most of the hardwood species (oak, aspen, birch, etc.). The problem of debarking hardwoods is not completely solved to the point where a definite standard practice has been adopted, and methods and machinery should be adjusted to local wood costs and quality requirements.

Chipping and Crushing of Chips

Before producing chemi-mechanical pulp by the cold soda process, the debarked wood should be chipped by the conventional method. The present tendency in cold soda pulping is to use chips ¼ to ⅜ inch long instead of the conventional ½ to ⅝ inch long size. It is a general feeling of research and operating personnel that small size chips will give a better penetration, increase the overall strength, and decrease the amount of rejects and shives in the final product.

Crushing the chips which was widely advocated for kraft plups by Nolan was investigated by von Koeppen **(8)**, who found that moderate crushing of different hardwood species did not adversely affect the overall strength of the pulp. On the contrary, it was found in laboratory, semi-commercial installation and production operation that moderate crushing of chips will in many cases contribute towards higher burst, tensile, and fold, due to better penetration of the liquor. The results of this author's investigations proved that moderate pre-crushing of the chips can be applied successfully in cold soda operations helping to overcome the impregnation problem typical for most existing cold soda operations.

There are several types of equipment which seem to be suitable for crushing chips. For example, Bauer Brothers Co. of Springfield, Ohio recommended a 245 single-disk refiner with spiked tooth plates driven by a 100 to 150 h.p. motor. Sprout Waldron Co., Muncy, Penna., advertised their "Chip Fractionator", which they claim will split the chips to a smaller, more uniform particle size **(9)**. E. D. Jones Corp., Pittsfield, Mass., offer the "Jones Vertiflex" for chip crushing. All these use the single disk refiner principle. Also

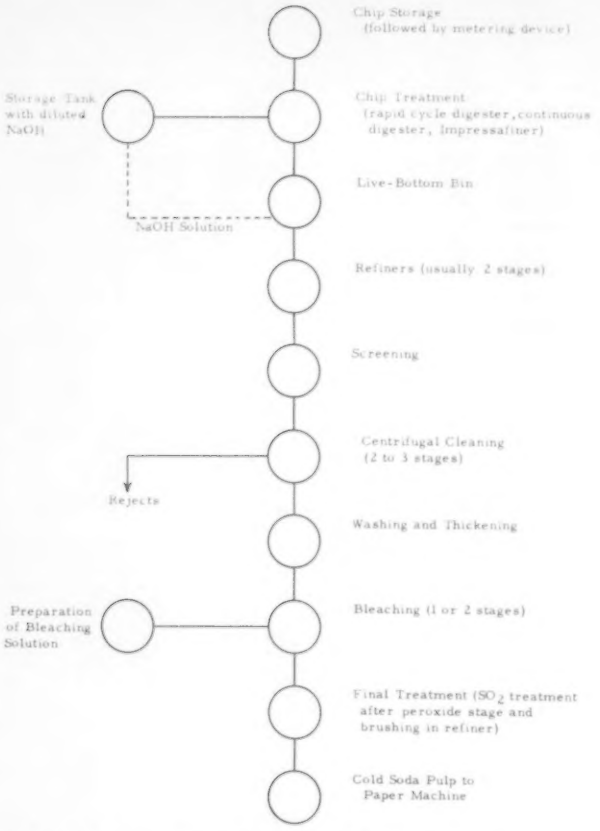


FIGURE 2: Major steps in the cold soda pulping process.

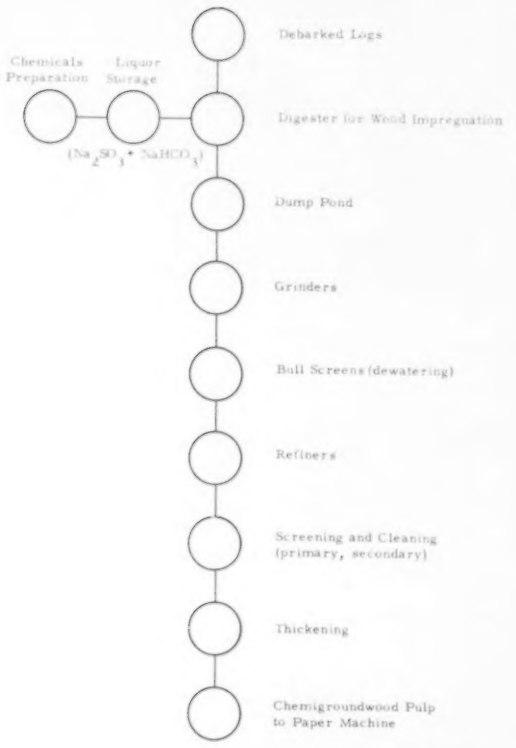


FIGURE 3: Major steps in chemi-groundwood process.

all of them employ special toothed plates.

Worth mentioning is another principle of crushing applied by Farrell Birmingham Co., Ansonia, Conn. Their "Stacomizer" consists of three rotating members—a backup roll, a driven work roll and a floating ring, which revolves freely between the rolls. The rolls are loaded by hydraulic pressure.

After chipping or crushing, the chips used in the chemi-mechanical processes are conveyed to the storage bin of the pulp mill in the usual manner. Wood transportation and wood storage of logs are thoroughly described in Klemm's book **(7)**.

Before describing the different chemi-mechanical processes, the author would like to submit a simplified picture of the processes involved.

Flow Sheet of Processes

There are five processes used for the production of chemi-mechanical pulps in U.S.A. and Europe, namely:

1. Cold soda process
2. Chemi-groundwood process
3. Stora-Brite process
4. A.L.B. process ("Semicell")
5. Blandin process.

Besides these, already in commercial operation, there are several others patented or where patents are still pending. The essential features of the above five processes are surveyed in Table I, and schematically illustrated in Figures 2, 3, 4, 5, and 6.

Cold Soda Process

In the cold soda process (Figure 2) chips are treated using hydrostatic, mechanical or atmospheric pressure.

After the treatment the liquor is usually collected, fortified by fresh sodium hydroxide solution, and used again. The pulp is refined in a two or three stage disk refining operation, screened, centrifugally cleaned, washed, and thickened. When the bleached pulp is used for printing papers or board, one or two stage high density bleaching is applied. After the final treatment, the pulp is ready to be used on the paper machine.

In some cases unbleached cold soda is used eliminating the bleaching stage (or stages).

Chemi-groundwood

In the "Chemi-groundwood" process (Figure 3) logs are treated with a mixture of sodium sulphite and sodium bicarbonate. The digester is evacuated for 0.5 hours at 27 inches mercury. Following evacuation the digester is filled with heated liquor. During the treatment 150 p.s.i. is held. After the treatment is completed, the logs are dumped in a pond and ground on regular grinders. Later the stock is directed through a regular bull screen, refiners, primary and secondary screens, and cleaners before thickening.

Stora-Brite Process

One of the newest developments came from Sweden where Stora Kopparberg developed a revolutionary process for the production of chemi-mechanical pulp from birch at high brightness (unbleached brightness of 60-65 G.E.), high yield, and strength similar to the strength of sulphite pulps **(10)**. Chips are presteamed, impregnated, and cooked in a continuous vertical digester. Pulp is blown to a cyclone, dewatered in a press, centrifugally

cleaned, and thickened before used on the paper machine. Major features of the Stora-Brite process, as it is called are shown in Figure 4.

ALB-Semicell Process

The ALB-Semicell process (Figure 5) uses logs cut to a special size. The Austrian patent No. 19038 **(11)** claims that chips can be used also. After the digester treatment, which should last less than 5 hours, the liquor is withdrawn and re-used again. Logs are washed, stored overnight, and ground at 70°C. in a conventional grinder. Yields of 80 to 90 per cent on b.d. wood are claimed. This process seems to be similar to the "Chemigroundwood" process, but the major differences claimed are:

Wood is pretreated, not in log form but cut into blocks.

Not only blocks, but also chips can be used.

Softwoods as well as hardwoods can be used.

Sodium sulphite without buffer is applied for impregnation.

Blandin Process

The Blandin process was described by C. A. Richardson (11a) at the 14th Alkaline Pulping Conference in Portland, Ore. The Blandin Paper Co. manufactures 90 per cent yield pulp from balsam fir and produces about 32 tons of this chemi-mechanical pulp. This is to the author's knowledge the only installation for producing chemi-mechanical pulps where coniferous species are used. The operation consists of pulping small-size chips by a continuous neutral sulphite process. It involves feeding belt-weighed chips to an inclined Bauer Messing-Durkee continuous digester equipped with Grenco inlet and discharge valves. The chips are impregnated with cooking liquor containing a mixture of sodium sulphite and sodium bisulphite for 15 minutes at 280°F and 85 p.s.i. Removal of the excess liquor in a Pressafiner and two-stage refining in disk refiners results in a pulp with Canadian Standard freeness of about 425 cc. After this the pulp is bleached with 0.4 per cent sodium hydrosulphite at 4.5 pH., using a low density upflow tower, then washed, diluted, and cleaned in a three stage centricleaner installation, deckered and bleached with peroxides to 69 brightness. After that the pulp is refined in a pump through refiner for a final freeness of 350 cc. C.S.F. and pumped to the storage chest for blending.

The chemi-mechanical pulp is used to the extent of 20 per cent of the fiber furnish substituting either sulphite pulp or 10 per cent each of groundwood and chemical pulp on two paper machines producing base stock and run at 1150 to1450 f.p.m. The resulting paper has higher bulk and opacity, about the same burst and slightly lower tear as compared to the original sheet where no chemi-mechanical pulp was included.

Chemistry of Cold Caustic

Generally, the cold soda process can be described as a treatment of wood chips with diluted sodium hydroxide at room temperatures followed by refining the treated chips in a disk mill. It is known that caustic solutions dissolve some of the hemi-celluloses and lignin at ordinary temperatures. This attack is accelerated when higher temperatures and concentrations of alkali are used.

Welch **(12)** investigated the influence of different inorganic solutions, including sodium hydroxide, on 26 different species. This investigation showed that from ten different chemicals, H_2SO_4, HNO_3, HCl, NaOH, NH_4OH, CH_3COOH, Na_2CO_3, NaCl, Na_2SO_3, and $(NH_4)_2SO_4$ used, NaOH gives the highest per cent of swelling. Except for caustic soda, the highest swelling figures have been obtained with glacial acetic acid.

Morath (13) reports that coniferous species like pine, spruce, and larch lose less than 10 per cent and oak, beech and linden less than 30 per cent of their wet bending strength after treatment with acids or alkalis in the pH range of 3 to 11.

Brown and McGovern **(14)** investigated the influence of atmospheric soaking of aspen chips at different temperatures and concentrations of NaOH. It was found that apparently, within the range of the experiment, neither the lignin nor the alphacellulose content of the pulp were affected by the treatment. These authors believe that the loss in yield was due mainly to a loss in hemicelluloses.

It was found later by Klauditz **(15)**, von Koeppen **(16)**, and Runkel and Schambach **(17)**, that not only hemicelluloses (pentosan) but the acetyl groups and some lignin were also removed. The effect of acetyl

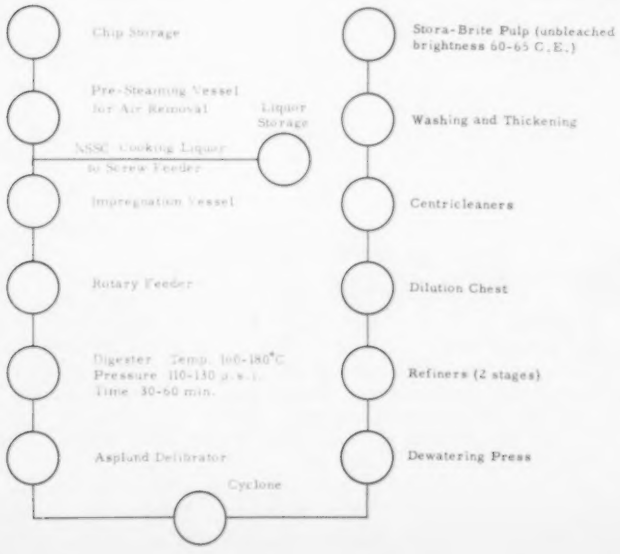
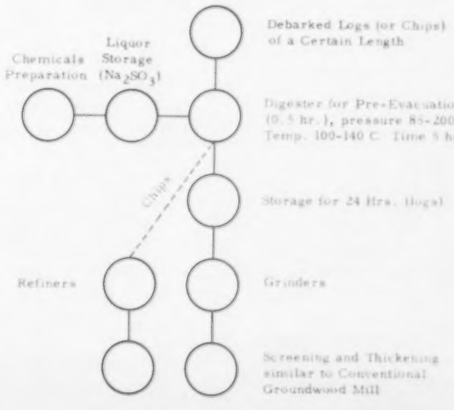


FIGURE 4: Major steps in the Stora-Brite process at Kvarnsveden mill, Sweden.

FIGURE 5: Major features of the Austrian ALB-Semicell process.


Debarked Logs (or Chips) of a Certain Length
Chemicals Preparation
Liquor Storage (Na_2SO_3)
Digester for Pre-Evacuation (0.5 hr.), pressure 85-200 p.s.i. Temp. 100-140 C. Time 5 hrs.
Chips
Storage for 24 Hrs. (log)
Refiners
Grinders
Screening and Thickening similar to Conventional Groundwood Mill

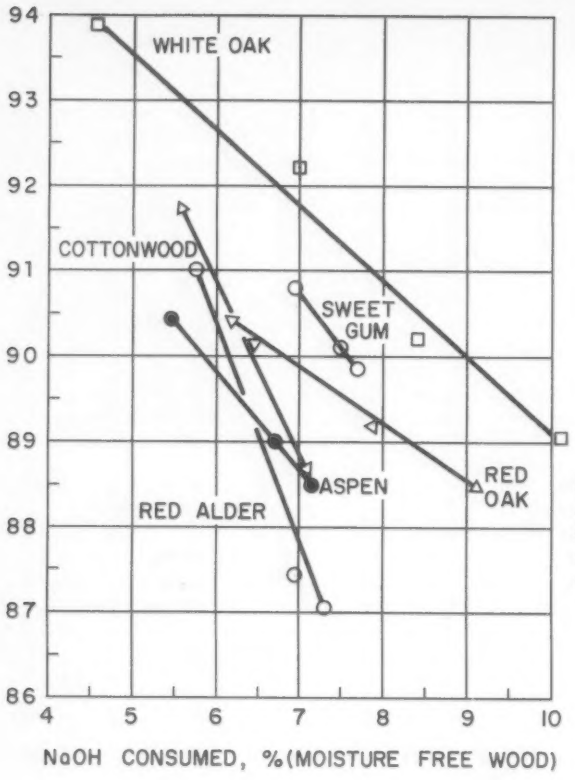


FIGURE 6: The effect of NaOH consumption on yield of several hardwood cold soda pulps.

groups on the tensile strength of hardwoods was studied by Klauditz **(15)**. He found that by treating birch and poplar wood with a sodium hydroxide solution of 0.2 per cent at 20°C, most of the acetyl groups are split off and the tensile strength of the wood decreases to about 50-60 per cent of its original value. This phenomenon is explained by Klauditz **(15)** as a splitting of the acetyl groups off the polyuronic hemicelluloses. When the acetyl groups are removed from the polyuronides, there is an increase in the hydration capacity of the cellwall and a corresponding decrease in strength. Not only are the acetyl groups removed, but it appears to weaken the bonds between hemicelluloses and the lignin, thus freeing the carboxyl groups, which add an additional decrease in the bonding strength of the tissue in deciduous woods.

Factors affecting the quality of pulp produced by the cold soda process are as follows:

1. Amount of chemicals consumed on b.d. wood
2. Yield of pulp
3. Concentration of alkali used
4. Temperature during the treatment
5. Pressure used during the treatment
6. Treatment time
7. Kind of machinery used for treatment
8. Chip size
9. Wood quality and species used

Most of these variables were investigated on aspen chips by Brown and McGovern at the Forest Products Laboratory, Madison, Wis. During this investigation, treatments were made with caustic solution in concentrations of 24 to 63 grams per liter at atmospheric pressure. Treatment time varied from 15 minutes to 5 hours. Temperatures from 25° to 90° C. were applied. They found that the optimum treating condition from the standpoint of the treating variables, pulp yield, and pulp strength was the two hour treatment at 25° C. with a sodium hydroxide solution having a concentration of 24 grams per liter. Chemical consumption for this treatment was about 5.5 per cent, with a yield of about 91 per cent.

Brown and McGovern **(14)** also found that the rate of pulping measured in terms of reduction in pulp yield, was rapid during the first stages of treatment and became slow toward the end of the treatment. This means that the readily soluble material had been removed in the early stages of the treatment. From these results, it is evident that chemical consumption increased with increase in time, temperature and alkali concentration.

Pressure treatment and other forced penetration methods and air removal procedures were investigated by Brown **(18)** on cubic blocks with sides of 0.5, 1, and 2 inches. These blocks of southern red oak heartwood were treated with a solution of 50 grams sodium hydroxide per liter at atmospheric pressure and under a hydrostatic pressure of 150 p.s.i. for periods of 0.5 and 2 hours.

From these results it can be concluded that different hardwood species respond quite differently to mild cold soda treatment, due to differences in wood texture, morphology and extractives. Therefore, we can assume that for practically every hardwood species there should be optimum pulping conditions, even if these conditions are not as much pronounced as for chemical pulps.

Previous penetration studies made with sodium hydroxide indicated that 150 p.s.i. was the most practical pressure for hydrostatic treatment. It was found that two inch blocks of red oak heart wood with a moisture content of 10 per cent picked up five times more liquor in 0.5 hrs. at 150 p.s.i. pressure than atmospheric pressure. Results of tests made on blocks that contained 35 per cent moisture showed the same beneficial effect of increasing pressure but to a lesser degree.

It was also found that a vacuum of 26 inch mercury applied on the two inch blocks and held for five minutes before the caustic soda liquor entered the autoclave helped the penetration considerably. Pre-evacuation also improved the results of the hydrostatic treatment but to a lesser degree. The importance of the particle size was proven when the dimensions of the red oak cubes were decreased from 2 in. to 0.5 in. Then the liquor absorption increased in a range of from 60.0 to 82.8 per cent (30 min. treatment at 150 p.s.i.).

Wood quality is of considerable importance to pulping and especially bleaching. This will be discussed later.

Cold soda pulping studies by Brown and McGovern **(19)** on different wood species resulted in a wide variety of yields and strength properties. For example, at the constant alkali concentration of 50 grams per liter used for pulping of six hardwoods, the alkali consumption was nearly the same for all woods except red oak, which was higher.

The pulp yields, however, ranged from 87-92 per cent, white oak ranking highest. In fact, the

differences between the various woods show up best in the relations between pulp yield and the amount of chemicals consumed (see Figure 6). It was also found during this investigation that aspen, cottonwood, birch, and red alder cold soda pulps are stronger than those from sweetgum and oaks at the same pulp yield. The strength of cold soda pulps increases when the yield decreases and also when the pulp is beaten to a lower freeness.

Two softwood species which were investigated (western hemlock and jack pine) did not respond satisfactorily to the standard cold soda processes applied to hardwoods. It was also found that bark has an adverse effect on cold soda pulping and on pulp and board quality.

Treatment with Sodium Sulphite

The chemi-groundwood, Stora-Brite and Blandin processes use buffered sodium sulphite solutions (NSSC). It is claimed that unbuffered sodium sulphite solution is used in the ALB process.

A considerable amount of work was done by Libby and O'Neil **(20)** in the treatment of hardwood logs, on the influence of pre-evacuation and hydrostatic pressure, liquor concentration, moisture content, and storage after the treatment on penetration of chemicals. Their work clearly indicates a progressive and greater penetration of salt bearing liquor, as the wood undergoes evacuation of the air, as the liquors are forced into the wood by hydraulic pressure, and as these two conditions are applied consecutively to two

TABLE I—SURVEY OF PULPING PROCESSES INVOLVED

Process	Cold Soda	Chemi-Groundwood	Stora-Brite	A.L.B. Semicell	Blandin
Materials Used	Hardwood Chips (all hardwoods except perhaps hickory, spp.)	Hardwood logs (aspen, beech, birch, and maple are preferred)	Hardwood chips (birch)	Hardwood and softwood logs (or chips)	Softwood chips (Balsam fir)
Yield (after refining or grinding) per cent	85-95	88	85	80-85	Over 90 (after pulping)
Pulping Chemical	NaOH	$Na_2SO_3 + NaHCO_3$	Neutral semi-chem. liquor	Na_2SO_3	$Na_2SO_3 + NaHSO_3$ (4:1)
Apparatus used for Impregnation	Batch digester, continuous digester, Impressafiner, bin for atmospheric soak	Digester for vacuum-pressure impregnation (batch)	Continuous up-flow digester	Digester for vacuum-pressure impregnation (batch)	Messing - Durkee (Bauer) digester
Impregnation technique used	Varies considerably from 2 hrs. at atmos. soak to 10-15 min. after Impressafiner. NaOH concentrations vary from 15 to 50 g.p.l. Room temperature.	Vacuum on digester 26-28° in. for 30 min. Pressure — 150-200 p.s.i. Time of treatment—6 hrs. Temp. —150° C	Presteaming treatment for air removal impregnation vessel (80-100° C) 5-15 min. Pulping in a digester. Time 30-60 min. Pressure — 110-130 p.s.i. Disk refining at digester temperature	Vacuum in the digester—29 in. Time —30 min. Pressure—85-200 lbs./sq. in. Temp. 100-140° C. Time 5 hrs. Storage after treatment	15 min. treatment at 280° F and 85 p.s.i.
Chemicals Consumed on b.d. Wood	4-10 per cent (as NaOH)		10% (as Na_2SO_3)	9% (as NaOH) + 3.5% (as S)	12% (as Na_2SO_3)
Power Used for Refiners or Grinders (H.P.D./t)	20-60	30-40		35	80
Refiners or Grinders Used	Refiner (Bauer and Sprout-Waldron)	Grinders (Great Northern)	Refiners (Asplund Raffinator)	Grinders (or refiners)	Bauer Refiners
Unbleached Brightness Per cent G.E.	35-50	45-64 (ref. 20)	60-65	60-64	52-59
Bleaching	One or two stages using hydrogen peroxide or two stage bleach using peroxide - hydrosulphite process. Part of the pulp production used in unbleached state for newsprint and corrugating medium	Unbleached pulp is used. Pulp could be bleached commercially to over 70 G.E. brightness with peroxides.	Unbleached pulp is used.	Unbleached pulp is used. Pulp could be bleached commercially to 70 G.E. brightness with peroxide.	Two stages bleaching using hydrosulphite - peroxide bleaching stages. Richardson (11a) stated that 0.4% sodium hydrosulphite and 1.2% hydrogen peroxide increased the brightness from 59 to 69% G.E.

* aspen, yellow birch (ref. 20)

batches of wood undergoing treatment. Libby and O'Neil also showed that liquor penetration varies substantially in a direct ratio to the concentration of chemical in the liquor, and that penetration of the liquor into the heartwood fraction of the log was scarcely more than 10 per cent of the penetration into the sapwood. This difference in penetration rates between heart- and sapwood seems to explain the difficulty often experienced in producing good uniform pulp from large diameter logs which contain large volumes of heartwood. They also found that a high moisture content inhibits penetration to a considerable degree and even a moderate amount of moisture affects penetration to an extent that proper adjustment must be made in impregnation conditions.

Libby and O'Neil **(20)** also found that the chemicals showed a slight tendency to migrate towards the center of the log during storage. However, this gain is not sufficient to account for the improvement in pulp properties obtained during the storage of treated logs.

Stone and Kallmes **(21)** worked on the effect of mild delignifying agents (Na_2SO_3 + $NaHCO_3$ and $NaClO_2$) on birch samples cut in blocks of 1¼ x 1 x (⅛ to ¼) inch. In this work the rheology of treated wood and the effect of chemicals on forces which hold together the fibers in wood was studied. These forces or bonds which hold the fibers together have to be overcome if the wood is to be converted into a pulp of intact fibers. During this investigation it was found that the strength of wood dropped off very rapidly as the material was dissolved by neutral sulphite liquor being one half the original strength at 98 per cent yield.

It was also found that the strength of wood was very dependent on temperature but became less so as the yield dropped and at 86 per cent yield the strength was substantially independent of temperature. Because similar studies with sodium chlorite treated wood were considerable amounts of lignin were removed, Stone and Kallmes **(21)** suggested that at this high yield the carbohydrate removal may be as important as lignin removal in weakening inter- and intra-fiber bonding. They also found that for untreated wood and for pulp of 94-96 per cent yield, the load of failure (and presumably the power required for refining) could be considerably decreased if the temperature rises from 25 to 100° C. Similar results were obtained by Lagergreen, Rydholm, and Stockman **(22)**.

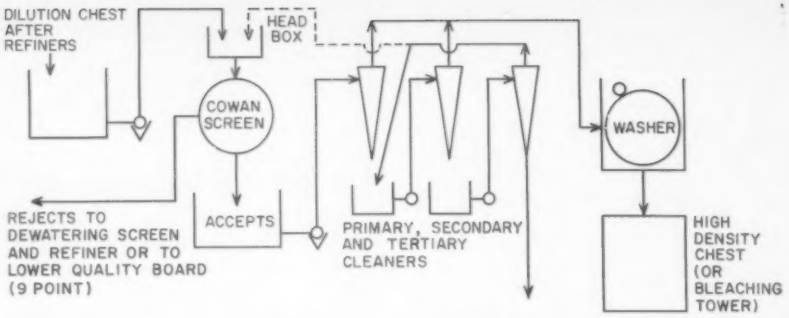

DILUTION CHEST AFTER REFINERS
HEAD BOX
COWAN SCREEN
WASHER
REJECTS TO DEWATERING SCREEN AND REFINER OR TO LOWER QUALITY BOARD (9 POINT)
ACCEPTS
PRIMARY, SECONDARY AND TERTIARY CLEANERS
HIGH DENSITY CHEST (OR BLEACHING TOWER)

FIGURE 7: General flow of screening and cleaning equipment in cold soda pulping process.

The basic research work done on NSSC pulping in different countries presents a good example that also besides cold soda there are other possibilities for the production of chemi-mechanical pulps. Developments at Blandin Paper Co. in U.S.A. and Stora Kopparberg in Sweden point in this direction. A survey of the different pulping processes is shown in Table I.

Impregnation Equipment Used

The cold soda process does not require elevated temperatures. Therefore, the following types of digesters may be used:

a. Rapid cycle digester (Bauer Brothers Co.)
b. Globe digester
c. Continuous digester (Bauer Brothers Co., Pandia)
d. Impressafiner (Bauer Brothers Co.)
e. Chip bin (Sprout-Waldron Co.)
f. Roller mill (Haug Kollermill, Stacomizer, etc.)

The treatment time varies from 15 minutes to two hours using 15-50 g.p.l. solution of sodium hydroxide.

In the production of chemi-groundwood and ALB pulps, stationary digesters are used. The Stora-Brite process requires a downflow type continuous digester supplied by A. B. Defibrator.

Refiners and Refining

Most cold soda mills in operation use disk refiners manufactured by Bauer Brothers Co. or Sprout-Waldron Co.

The action of disk mills can be grouped into three categories:

1. Fiberizing the chips where high speed and high consistency are required
2. Dispersion
3. Quality development

The quality development is usually carried out at a rather low speed (450-900 r.p.m.) and in single disk units.

There are many variables which affect the quality of the refined pulp; namely,

1. The power used
2. Yield and amount of chemicals applied
3. Clearance between plates
4. Temperature at the surface
5. Fiberizing equipment
6. Working area of fiberizing
7. Through-put rate
8. Design of the plates used
9. Consistency in the refiner
10. Shear speed
11. pH during refining

Varying these factors lead to different qualities in pulp and consequently paper or board. Unfortunately, the amount of work done on refining is very limited and one has to rely on the ability of the supervisory and operating personnel to carry out this operation successfully.

In the existing cold soda mills, Bauer Brothers, No. 410 (40-inch diameter, double disk) or Sprout-Waldron 36-2 (single disk) refiners are common. For the final refining of cold soda pulp, a single disk pump-through Bauer refiner, No. 440 and 442 is often used. This is a slow speed, high capacity mill designed especially for stock preparation. The Great Northern Paper Co. uses Great Northern grinders for its chemi-groundwood production. Stora-Kopparberg uses the Asplund Defibrator following the single-disk Asplund "Raffinators" **(10)**.

Refiners are usually arranged in a parallel two-stage refining operation. It is claimed **(23)** that arrangement in a series will slightly increase the power consumption and decrease the throughput of the cold soda pulp mill.

An interesting new development recently introduced by Black-Clawson Co. is the "Chemifiner." This is

a relatively low speed, low power operated single disk refiner using consistencies above 20 per cent. The pulp is rolled in all directions under compression between the plates. The refining treatment is obtained by lateral and angular adjustment of the floating plate under pressure control. The working surface is 50 inches in diameter and powered with a 150 h.p. motor. It is claimed that this is a new way to fiberize chemi-mechanical (and other high yield) pulps and that pulp, with superior properties, can be produced at a low power consumption.

Screening and Cleaning

Important stages in the production of chemi-mechanical pulps are screening, cleaning and rejects recovery. After the refining, the pulp is diluted in a dilution chest and screened in centrifugal screens. In some cases, before the centrifugal screen, a flat vibration screen is used.

It is now a recognized fact that chemi-mechanical pulps should be properly cleaned in vortex type cleaners (Bauer Centricleaners, Leje and Thurne cleaners, Vorjects, etc.).

A flow sheet typical for a cold soda cleaning operation is shown in Figure 7.

The Chemi-groundwood screening system is thoroughly described in an article by Evans **(24)**. The Stora Kopparberg Co. does not use preliminary screens **(24)**; the pulp is centricleaned only **(10)**.

The problem of rejects recovery in chemi-mechanical pulp mills can be considered similar to the one facing the groundwood mills. Up to now the problem of rejects recovery in groundwood mills and chemi-mechanical operations is not yet completely solved. It is claimed by the overseas suppliers and production men **(25)** that the new Reisten refiner represents a considerable improvement over the widely known refiners, because a considerably larger refining area was added. Besides this, the use of oil pressure between three pairs of refiner disks and the recirculation of a considerable amount of stock within the refiner helps to achieve good results.

In general, one can say that at the present, most of the chemi-mechanical installations do not have a capacity over 60-80 tons per day.

This makes the problem of rejects recovery a rather difficult one. It is known that most of the existing cold soda pulp mills usually send their rejects from the centrifugal screen to the refiner feed. Rejects from the final centricleaning stage can be sewered or added to pulp used in wallboard or 9-point board production.

Next week's installment discusses bleaching of cold soda pulps.

REFERENCES

1. Chidester, G. H., **Paper Trade Journal** 144, No. 29, Page 51-52 (July 18, 1960).

2. **Food and Agriculture Organization** of the United Nations, "Raw Materials for More Paper," No. 6:3-172, pg. 3 (April, 1953).

3. Chilson, W. A., **Southern Pulp and Paper Manufacturer,** Vol. XXIII, No. 5 pg. 54-58 (May 10, 1960).

4. "Timber Resources for America's Future," **Forest Resource Report,** No. 14, Forest Service, U. S. Department of Agriculture, January, 1958.

5. Bromley, W. S., **Paper Trade Journal** 141, No. 2:40-43 (January, 1957).

6. Anon. **Chemical and Eng. News** 38, 36 pg. 48-50 (September 5, 1960).

7. Klemm, K., "Modern Methods of Mechanical Pulp Manufacture," published by Lockwood Trade Journal Co., 1958.

8. von Koeppen, A., Unpublished work.

9. "Better Fibers," Bulletin issued by Sprout, Waldron Co., Muncy, Pa., Vol. 1, No. 2.

10. Evans, John C. W., **Paper Trade Journal** 143, No. 36-39 (August 24, 1959).

11. Austrian patent, No. 190380, granted on June 25, 1957.

11a. Richardson, C. A., "Ultra High Yield NSSC Pulp from Balsam Fir," Paper presented at the 14th Alkaline Pulping Conference in Portland, Oregon, on August 8, 1960.

12. Welch, M. B., **Journal Proceedings of the Royal Society of N. S. Wales** 69, 159 (1935).

13. Morath, E., **Wachbl Papierfabr.** 64, 742 (1933).

14. Brown, K. J., and McGowen, J. N., Tappi, Vol. 33, No. 8, pg. 364-368 (August, 1950).

15. Klauditz, W., **Holzforschung** 11, No. 2:47-55 (May, 1957).

16. von Koeppen, A. Unpublished work.

17. Runkel, R. O. H., and Schambach, H., **Holzforschung** 14, No. 2:33-40 (June, 1960).

18. Brown, K. J., **The Paper Industry,** 3 g: pg. 844-850 (January, 1958).

19. Brown, K. J., and McGowen, J. N., **The Paper Industry** 35, No. 1:66-69 (April 1, 1953).

20. Libby, C. E., and O'Neil, F. W., "The Manufacture of Chemigroundwood Pulp from Hardwoods," Pamphlet issued by State University of New York, College of Forestry, Syracuse, New York (1950).

21. Stone, J. E., and Kallmes, O., **Pulp and Paper Mag. of Canada,** 58, No. 7: 191-196 (June, 1957).

22. Lagergreen, S., Rydholm, S., and Stockman, L., **Svensk Papperstidning,** 60, No. 17:632-644 (September 15, 1957).

23. von Koeppen, A., Private information.

24. Evans, John C. W., **Paper Trade Journal** 140, No. 46:24-28 (November 12, 1956).

25. von Koeppen, A., Private information.

"They're going to crown the queen roll."

"Blacksmithing" of Screw Conveyors Only Increases Down Time

Proper selection and precise erection are very important procedures. After these are accomplished, their upkeep is simply reduced to lubrication, periodic replacement, cleanout, and painting.

J. B. Green,
Project Engineer,
Industrial Research & Development,
Jeffrey Mfg. Co.

Use of the screw for handling material dates back, by historical record, to the spiral conveyor used by Archimedes to lift irrigating water. Study of some screw conveyor installations leads one to wonder if we have learned anything in the intervening years about the application or maintenance of spiral conveyors. Since this is not precision machinery and an operable system can still be hammered out in a back-alley fabricating shop, the tendency is to treat the machinery with the same respect and maintain it with the same diligence as an oxcart.

A spiral conveyor is a simple uncomplicated machine with only one moving part, aside from the drive machinery. Maintenance of this basic machine is therefore as simple and uncomplicated, provided all operating conditions, both as to environment and function, are given proper consideration before selection and installation. This leads us to the basic problem normally encountered in the proper functioning of a spiral conveyor, that of proper selection. This problem has two separate and distinct forms: (1) Should this type equipment be used at all for handling this material and (2) if this question can be factually answered in the affirmative then the important problem of selecting the proper components to reduce maintenance must be solved (prior to installation). This second problem deserves complete discussion.

Standardized Components

The spiral conveyor industry has done a very workmanlike job in its efforts to standardize the basic components. Yet despite its efforts to reduce the types of individual components there remains a large variety of such components available for selection and incorporation into a system to perform a specific job. This is necessary because of the differences in materials to be handled, the conditions under which it is to operate, and the nature of the process involved. The Conveyor Equipment Manufacturer's Association lists as standard 46 categories in sizes 6 inches diameter through 24 inches in diameter for sectional flight and 23 categories in sizes from 4 inches diameter through 16 inches diameter for helicoid. There are 10 different styles of hangers, each style in sizes for 1 inch diameter coupling through 3-7/16 inches diameter and adaptable to all types of bearings including wood, bronze, chilled iron, nylon, anti-friction, etc. There are 41 categories of U-shaped conveyor troughs in sizes from 4 inches through 24 inches and all these categories can be purchased as special in pipe or flared construction. A comparable multiplicity of other components are available, and most all components are also available in stainless steel and/or aluminum.

Such a variety of components of necessity complicate the manufac-

TABLE I—MATERIAL CLASS DESCRIPTION

	Material characteristic	Class
Size	Very fine—100 mesh and under	A
	Fine—⅛-inch mesh and under	B
	Granular—½-inch and under	C
	Lumpy—containing lumps over ½-inch	D
	Irregular—being fibrous, stringy, or the like	H
Flowability	Very free flowing—angle of repose up to 30°	1
	Free flowing—angle of repose 30° to 45°	2
	Sluggish—angle of repose 45° and up	3
Abrasiveness	Nonabrasive	6
	Mildly abrasive	7
	Very abrasive	8
Other characteristics	Contaminable, affecting use or saleability	K
	Hygroscopic	L
	Highly corrosive	N
	Mildly corrosive	P
	Gives off dust or fumes harmful to life	R
	Contains explosive dust	S
	Degradable, affecting use or saleability	T
	Very light and fluffy	W
	Interlocks or mats to resist digging	X
	Aerates and becomes fluid	Y
	Packs under pressure	Z

turing, stocking and distribution problem of the manufacturer so the question logically arises as to why. The answer is simply that this is necessary, in the opinion of the majority, to serve the various customer requirements. It therefore follows that in the original selection of the equipment the user has such a wide choice that it behooves him to select those components which will operate at maximum efficiency and optimum capacity. The various manufacturers have endeavored to standardize selection procedures in order to assist the user in making a component group choice that will accomplish this goal.

More than 300 different materials, adjudged "tractable" by spiral conveyors, have been classified according to the characteristics shown in Table I, and a typical method of listing is as shown in Table II. Even with this information selection should in the final analysis be guided by judgment based on past experience.

Aside from the more obvious factors such as: capacity, length, horsepower, appearance, process requirements etc., let us now consider some of the design factors which have the greatest impact on the maintenance problem. These factors may be divided according to (a) characteristics of material handled, (b) conveyor characteristics and (c) environment.

TABLE II

SOME BULK MATERIALS INDIGENOUS TO PULP AND PAPER MILLS HANDLED BY SCREW CONVEYORS

Material	Avg. Wt. per Cu. Ft. Lbs.	Class (See Table I)
Coal, anthracite	60	C27P
Coal, bituminous, mixed, 50 mesh and under	50	B36P
Coal, bituminous, mixed, sized	50	D26PT
Coal, bituminous, mixed, slack, ½" and under	50	C36P
Fine Alum	45-50	B26*
Kaolin clay, 3" and under	163	D27
Lime, ground, ¼" and under	60	B36Z
Lime, hydrated, ¼" and under	40	B26YZ
Lime, hydrated, pulverized	32-40	A26YZ
Lime, pebble	53-56	D36
Limestone, crushed	85-90	D27*
Limestone, dust	75	A37Y*
Bark, wood, refuse	10-20	H37X*
Pulp		*
Salt cake, dry, coarse	85	D27
Salt cake, dry, pulverized	65-85	B27
Sawdust	10-13	*
Slag, furnace, granulated	60-65	C28
Soda ash, heavy	55-65	B27
Soda ash, light	20-35	A27W
Starch	25-50	*
Sulphur, crushed, ½" and under	50-60	C26S*
Sulphur, lumpy, 3" and under	80-85	D26S*
Sulphur, powdered	50-60	B26SY*
Trisodium phosphate	60	B27
Wood chips	10-30	H36WX*
Wood flour	16-36	*

*Consult the Manufacturer

Material Characteristics

Material characteristics include such things as bulk density, corrosiveness, abrasiveness, moisture content, size, etc. It must be remembered that a spiral conveyor is a volumetric machine and its gravimetric capacity, which is the usual design criterion, is dependent upon bulk density. Many materials, especially those which are finely divided such as bulk cement, may vary enough in weight per unit volume to materially effect capacity. It is therefore vitally important to base the volumetric capacity of the unit selected on the lowest density possible, but base horsepower on the highest density.

Corrosive properties of the material are quite obviously a vital characteristic and this can be combated by the proper selection of construction materials or protective coating. Since the cost of stainless steel components is about 7 to 8 times that of plain carbon steel, a careful analysis of the corrosion rate, maintenance and replacement costs, downtime and other economic factors must be carefully studied if the most economical selection is to be made. Under certain operating conditions, even though the material may be quite corrosive and consequently the life of the conveyors relatively short, it may be more economical to use carbon steel and replace it at planned intervals than to use the more costly stainless steels. Involved in this consideration is the fact that carbon steel components are available from stock while stainless parts are all made on order and the manufacturing time is a consequential factor. On the other hand if constant operation with short maintenance schedule time is the nature of the process, it may be more economical to make the larger initial investment.

Abrasiveness of material being handled is probably the most vital factor in the service life and maintenance of a spiral conveyor. There are numerous ways to combat the abrasion problem but none of them are entirely satisfactory. The use of abrasion resistant steels results in limited success as does some of the abrasion resistant coatings but it is questionable as to whether or not any of these are worth their additional cost. It is our opinion that generally speaking the most economical defense against abrasion is to use the heaviest standard spiral and trough available in the size required and replace it at planned intervals. Another step that helps prevent trough abrasion is to provide excess clearance between the spiral and the trough so that the material flows on itself. Hard coating the flighting with such metallic elements as Stellite will give additional wear life but again the economy of such procedure is questionable and should be carefully evaluated before a decision is reached. Many materials have other characteristics that make the use of spiral conveyors very desirable but are just too abrasive, in which case, it is better to resort to some other conveying means.

Physical size of individual pieces being handled must be carefully considered in light of clearance between flights and at the hangers. A major problem in spiral conveyors is interference at the hangers by pieces too large to pass the opening. This invariably results in tearing out a hanger or stripping the flights from the pipe.

Conveyor Characteristics

Important conveyor characteristics to be considered are: size, speed, length, power, materials of construction, style of hangers, drive machinery, erection, etc.

In selecting the proper diameter

one must consider first the depth of cross-section required for a fixed capacity. All manufacturers' catalogues list recommended maximum speeds for a given size and maximum cross-section for a given material. If the cross-section exceeds that recommended the result is excess hanger bearing wear, if not outright plugging, plus excessive horsepower to drive. The majority of applications have plain bearings of one type or another without seals so that even mildly abrasive material if finely enough divided will cut the bearings unless the cross-section is kept low enough to minimize entry into the bearing space. Even at 30 per cent loading many materials will ride up on the carrying side of the spiral far enough to spill down onto the shaft and thus cause excessive bearing wear. There are applications where the speed and conveyor length make the use of anti-friction bearings desirable. Although much effort and thought has been expended in the attempt to design an anti-friction hanger bearing seal, no completely satisfactory solution has been found, particularly if the cross-section of material is not kept to a very low level.

While catalogue data usually limits maximum r.p.m. by size of spiral and type of bearings it should be remembered that different materials have different friction coefficients so that they are not all carried over by the screw at the same rubbing speed. Care should be exercised not to run the screw too fast for the material being handled at a given cross-sectional loading. It is always desirable, in any case, to run the screw as slow as practical consistent with size, and required capacity, as this naturally reduces wear.

The limiting factor in the length of run or power that can be transmitted is the diameter of the drive or coupling shafts. The listings of horsepower per r.p.m. is based on the usual shafting design, formulae and should be strictly observed. It is possible to increase these ratings by using alloy steel in lieu of the stock carbon steel. Another method of increasing the straight length is to drive from both ends of the conveyor, in which case each drive should be coupled to its portion of the conveyor. Do not make the spiral continuous but break it somewhere between the drives so that one drive will not have a tendency to do all the work. Since the transmitted torque increases linearly in the direction of the drive it is sometimes convenient to change coupling diameters at some intermediate point in the conveyor. For example, if 9 inches diameter helicoid is available from stock in both 1½ and 2 inch diameter couplings and the length of the conveyor may be such that with the conditions of speed and load the end away from the drive could be equipped with 1½ inch couplings while that nearest to the drive would be 2 inch diameter.

Proper Hanging

As has been previously stated, there are at least 10 different styles of hangers, each of which may be equipped with various bearings. Selection of the proper hanger must be governed by the type of bearing to be used, size of lumps in the material, volume in the trough etc. It is obvious that if there is a heavy cross-section or fairly large lumps, the hanger used should be that offering the least cross-section in the direction of flow. In some instances the presence of hangers is intolerable and if the conveyor is not too long wear strips in the bottom of the trough may be used. The majority of hanger styles are designed for use with babbitted, bronze, hardiron or oil impregnated wood bearings and the proper selection will materially influence the maintenance problem. Anti-friction bearings are of the self-aligning ball bearing type. They will reduce the horsepower to drive and will result in noise-free operation. However, the problem of sealing against the entry of material must be carefully studied or the maintenance problem will be much more severe than in the case of plain bearings. It is well known by every maintenance man that the life of an anti-friction bearing is no better than the seals and he also knows that as a plain bearing wears it can be watched closely and replaced at his convenience but with a ball bearing it's a different matter. They usually freeze and prevent any rotation, thus necessitating an unscheduled shut down of the conveyor. This may or may not be serious depending upon the process involved but it is always a nuisance to the maintenance supervisor.

The selection of spiral conveyor drive machinery has been greatly simplified, from the maintenance standpoint, during the past 5 or 6 years. For many years the conventional drive consisted of a motor and reducer, or Motoreducer, driving through a chain and sprocket drive to the spiral input shaft. For economy and space reasons it was general practice to place the driven sprocket on the drive shaft without benefit of an outboard bearing. The resulting overhung load and cantilever condition caused the end plate to wobble and resulted in failure of the end bearing. With the present general practice of using a shaft mounted reducer bolted to the trough end the input to the shaft is a torque load only. This is much superior to the older drive in many respects, particularly as regards maintenance. It goes a long way in eliminating bearing failure, leakage around the shaft and failure of trough ends due to flexure. Aside from these advantages it saves space and is less expensive. All of the spiral conveyor manufacturers offer this drive and, while there are differences that favor one reducer in one instance and another under other conditions, they are all quite satisfactory.

Insufficient support, improper alignment, and blacksmithing techniques assembly are often all too common in the erection of spiral conveyors.

Careful Erection

One of the most important factors in lowering maintenance problems, after the proper components have been selected, is the care and precision exercised in the erection. Insufficient supports, improper alignment and blacksmithing assembly techniques are too often the order of the day in erecting a spiral conveyor system. It is obvious that any rotating equipment, even if not precision machinery, must be assembled in a straight line if binding and excessive wear are to be avoided. Standard trough is usually manufactured in a jig and while the end flanges may be square with the length at the time of manufacture such is seldom true by the time it arrives on the job. The collars and coupling bolt holes in the ends of the spiral are usually jig drilled but machine tolerances, assembly and replacement problems necessitate clearances at each joint. If care is not

exercised at field assembly the conveyor will be kinked at the joints. Hangers have slotted holes to facilitate field alignment. These factors, and many others, dictate the necessity for proper alignment and erection procedures. One of the most common errors and very often the source of maintenance problems is the mounting of the reducer (where shaft mounts are used) on the end of the trough. If the reducer shaft is not in line with the screw the reducer will wobble. This over stresses bolts, fatigues trough ends, eccentrically loads bearings and seals. This condition is very common and generally results from out of squareness of trough end or a bent section of spiral. If the former is the cause it can usually be easily corrected by shimming between the reducer and the box end. If the latter is the cause the screw will need to be straightened.

Environmental conditions influencing selection are normally quite simple to evaluate. Such conditions are usually a question of whether the installation is inside a building or outside. If outside and exposed to the elements, weatherproof trough and cover construction may be indicated. To prevent atmospheric corrosion, a rust-preventitive coating or paint is usually sufficient. If the process involves a chemically corrosive atmosphere then corrosive resistant materials may be necessary.

All above discussions have been of a general nature without specific reference to any particular industry. The use if spiral conveyors in the pulp and paper industry may find a variety of applications such as the handling of raw chips, cooked chips, salt cake, or coal to the power house.

Handling Chips

The handling of materials other than chips is usually a routine matter and the selection of components and materials of construction is not particularly complicated. For this service it is usual to select standard carbon steel components of a gauge determined by the normal service life expectancy.

Discussion of chip handling devolves into two distinct problems (a) handling of raw chips from the chipper and (b) cooked chips from the digesters.

When moving chips from the chipper it is necessary to screen out the oversize chips to prevent hangup at the hangers; this is usually required in the process. Plain carbon steel of standard construction is quite satisfactory. Number 20-B hangers with hard iron bearings are recommended and a maximum loading of 30 per cent is mandatory if plugging at the hangers is to be avoided. Deviation from standard trough and spiral construction at discharge openings is necessary to obtain trouble-free discharge. The length of trough discharge openings should not be less than 1½ times the pitch of the screw and the spiral should be equipped with what is commonly referred to as a kicker flight over the opening. There are a number of ways of accomplishing this; a reverse flight, a flat plate welded along the pipe or a mixer type blade. The purpose of the kicker is to prevent arching over the discharge point and assure positive discharge rather than depending upon gravity. Since raw chips have a tendency to ride up on the carrying side it is desirable to keep the screw r.p.m. fairly low.

Extreme caution must be exercised to select welding rods compatible with the conveyor's base steels. Columbium stabilized rods are quite satisfactory for stainless steels in contact with cooked NSSC chips.

The handling of cooked chips presents a multitude of problems but with the selection of proper components and materials these problems can be solved to the extent that spiral conveyors give excellent service with low maintenance costs and dependable operation. Where the cold soda process is utilized the cooked chips may be readily handled with carbon steel components. However, the NSSC process yields products that dictate the use of acid resistant materials. The fatty acids formed by this process attack carbon steel to the extent that use of 304 or 316 stainless is more economical. Where type 304 is used it is recommended practice to use thicknesses of 3/16 inch or ¼ inch while with type 316, No. 10 gauge thickness is quite satisfactory. In view of the electrolytic nature of the solutions extreme caution must be exercised to select welding rods compatible with the base steels. Columbian stabilized rods are quite satisfactory. This is very important since the use of stainless steels make it necessary to use buttwelded or section flighting instead of helicoid, in which case there is a considerable quantity of welding. Due to limited quantities manufactured and also to forming problems stainless steel helicoid is not available from the manufacturers.

Regardless of the materials of construction certain design features should be followed if one is to avoid trouble in handling cooked chips. Trough loading for conveyors should be kept below ⅓ the cross-section and hangers of any kind are to be avoided if possible. The elimination of hangers may, depending upon length, dictate the use of longitudinal wear bars at the bottom of the trough. Where this is the case more than the normal clearance between the spiral and the trough must be provided and this space filled with renewable flat bars tack-welded or bolted longitudinally to the trough bottom. This will limit somewhat the allowable length of any one run but process equipment can usually be so arranged as to obviate the necessity for such. It is also possible to overcome this disadvantage to some extent by the use of parallel offset units driven from a single reduction. Where hangers are used the best service is rendered by use of No. 20-B or 26-B hangers fabricated from 316 or 304 stainless steel with hard maple inserts. The precautions referred to previously for discharge points are even more important here. In many instances it is good practice to double stack and continuously weld flighting to the pipe in the event of a hang-up in either the conveyor or the process machinery.

Pressed chips present the added problem of changing bulk density while being conveyed. They are delivered to the spiral conveyor from the presses as an extruded mass and start to break up immediately. The further they are moved the lower the density and the greater the volume. Proper design for these conveyors is to use variable pitch screws and to avoid hangers altogether.

As Volumetric Feeders

Perhaps the most important application of spiral in the pulp and paper industry is as volumetric feeders. They are readily adaptable to such service since only a variable speed drive is required to change flow rate. However, use of single or multiple screws in a feeder is far more complicated than the convey-

(Continued on page 38)

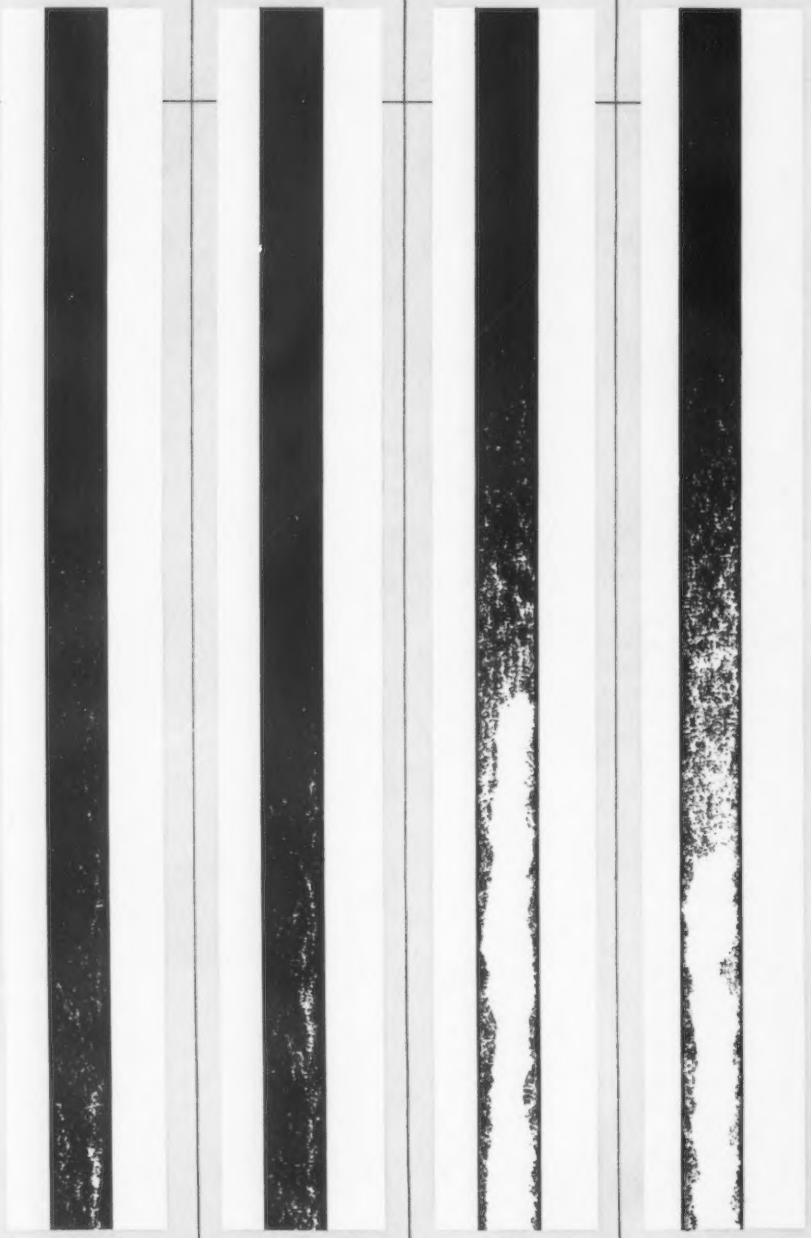
VELOCITY CHART FOR IGT PRINTABILITY TESTER

INK USED IPI NO. 6

SPRING TENSION USED [X] A [ ] B

PRINTING VELOCITY, FT./MIN. AT 35 Kg. PRINTING PRESSURE

A TENSION	B TENSION
100	100
200	200
300	300
400	400
	500
	600



DOW LATEX 630 COATING
Picking Velocity: 290 Ft./Min.

COMPETITIVE LATEX COATING
Picking Velocity: 150 Ft./Min.

PROVEN commercially... greater pick resistance with DOW LATEX 630

The velocity chart, left, for IGT Printability Tester provides proof of the greatly superior pick resistance of new Dow Latex 630. Here, laboratory test data are reported on the relative printability of commercially coated papers.

The two strips on the right coated with a competitive latex represent the performance of the "standard" grade. The two strips on the left represent the performance of that grade with Dow Latex 630 replacing the competitive latex in the coating.

In this test, Number 6 ink was used, and "A" spring tension. The test strips show that average pick velocity of strips with the competitive latex coating was 150 ft. per minute. But strips coated with Dow Latex 630 showed an average pick velocity of 290 ft. per minute . . . also note the reduction in bodystock splitting and the "blacker" black of the ink with the Dow Latex 630 coating.

In addition to greater pick resistance, Dow Latex 630 offers exceptional starch compatibility, excellent mechanical stability, and other outstanding advantages. Together, they spell superior printability . . . paper that permits clear, sharp, true-to-life reproduction with a minimum of problems for the pressman. Type reproduction stands out sharp and clear, too, because coatings made with Dow Latex 630 produce a more uniformly smooth printing surface.

Find out how Dow Latex 630 can help you to produce better paper . . . and boost your sales. For detailed information, write today to THE DOW CHEMICAL COMPANY, Midland, Michigan, Coatings Sales Department 1931DP4-17.

Write for a free copy of this informative booklet on new Dow Latex 630. It contains valuable data and information on how you can improve the performance of your coated papers.

THE DOW CHEMICAL COMPANY DOW Midland, Michigan

Look to the Southeast Coastal 6!

When you build your new plant in Virginia, North or South Carolina, Georgia, Florida or Alabama, you'll benefit from expanding markets as well as from abundant timber and good rivers.

This region offers so many advantages in resources, climate, labor and tax matters. And, of course, Coast Line furnishes any shipping service you need to markets near or far.

To learn about sites that will open your eyes, call, write or wire us—all inquiries held confidential.

Direct inquiries to:
R. P. JOBB
Assistant Vice-President
Department G-431
Atlantic Coast Line Railroad
Jacksonville, Florida

ATLANTIC COAST LINE RAILROAD

. . . serving the Southeast Coastal 6

"Blacksmithing" . . .

(Continued from page 35)

ing problem. Where used to provide a live bottom bin and to feed at a fixed or controlled rate the superimposed bin loads, direction of rotation of the screws, arching tendency of materials and many other variables combine to make it a much more complex problem that is at first apparent. Since feeders of necessity must run 100 per cent full the use of hangers is out of the question. Because of the superimposed bin loads the length is limited and depends upon the screw diameter, rate of feed, material characteristics, etc. No effort will be made here to go into detail on feeder design except to say that variable pitch and variable diameter are in order and that each feeder problem is unique and feeders should be designed with utmost care if it is to operate satisfactorily.

Once the spiral conveyor is properly selected for the application the routine maintenance is reduced to simple lubrication of rubbing parts, periodic replacement of worn or corroded components, painting and periodic clean-out as the process dictates.

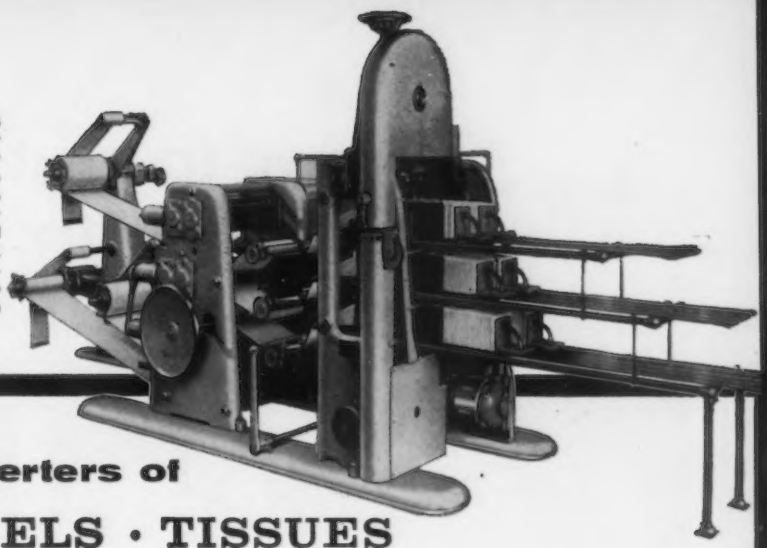
Lubrication procedures for the reducers and motors are usually described on the name plate or in the service manual of the individual units. Hanger bearings and box ends are usually grease lubricated if lubrication is required. The general tendency is to overlubricate, particularly in the case of anti-friction bearings. The frequency of grease application will be dictated by the operating cycle, the type of lubricant and the process.

Routine examination of all parts will dictate replacement procedures. Replacement of worn or corroded components prior to failure will save process down time and lower actual maintenance labor, since the work can be scheduled and replacement parts be made available in advance. An adequate supply of spare parts cannot be overemphasized. What constitutes an adequate supply will depend upon many factors such as; availability from local suppliers, frequency of failure, size of the installation, preventative maintenance schedule, importance of process down time, etc.

As previously stated, good housekeeping will probably reduce maintenance costs more than any single item except proper design and selection and in some instances may be equally as important.

A NAPKIN FOLDER WITH TRIPLE EMBOSSER

Pacemaker for the industry, this machine produces regular or facial quality napkins (and other paper or cellulose products) of all standard sizes in perfectly folded squares. Rotary in operation, it handles one to four parent rolls simultaneously and produces up to 2400 completed printed and embossed napkins per minute! Multi-color oil or flexographic ink printing and embossing units can be furnished or added as required. Heavy duty construction, high production speed, dependability, low original cost plus low maintenance expense makes this machine the most popular napkin producer in the industry.



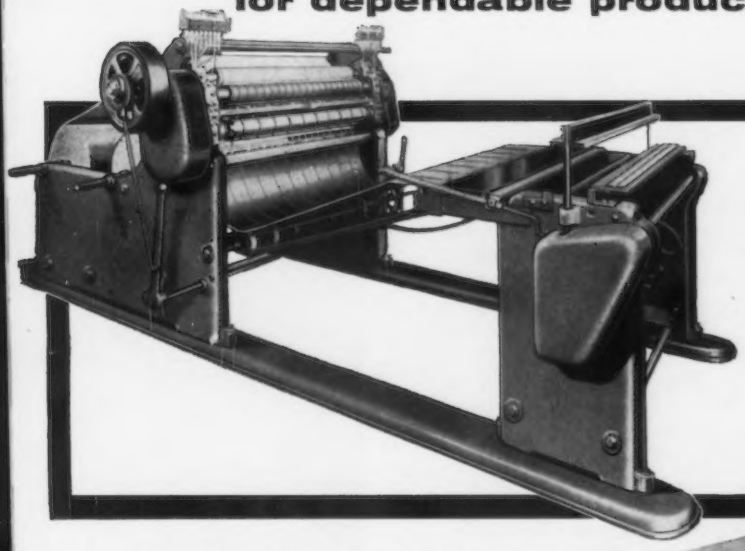
Leading converters of

NAPKINS · TOWELS · TISSUES

rely on these

HUDSON-SHARP "workhorses"

for dependable production capacity

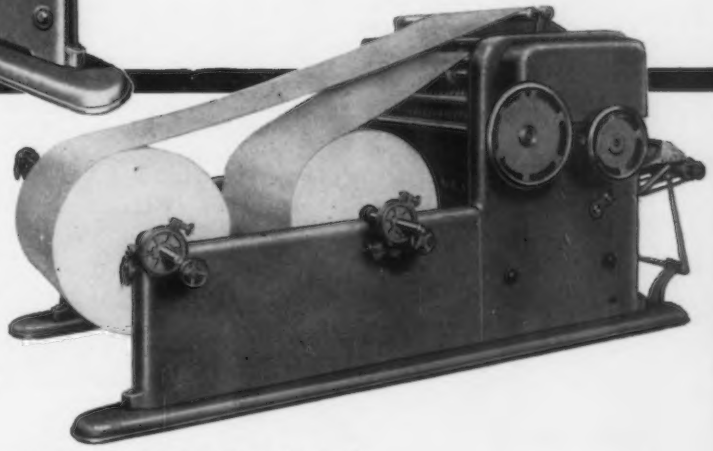


ROTARY TISSUE INTERFOLDER

Production of single or double-ply interfolded toilet tissues in single or multiple folds reaches unprecedented new highs with this modern Hudson Sharp machine. Sturdily constructed and completely rotary in operation it carries paper from parent rolls through feed rolls, into folding cylinders, and continuously delivers a product of exact sheet count to the packaging unit. Equipped with a semi-automatic banding unit, one operator easily handles the machine's entire output. Embossing units can be added if desired.

ROTARY TOWEL AND WAX INTERFOLDER

Designed to produce interfolded towels in any standard size, this machine produces from 10 to 12 cases, per towel width, per hour! Completely rotary in operation, all necessary adjustments are simple to make and easily accessible. Furnished in any widths up to 60" in all standard sizes and folds. Besides towels, this machine is practically adaptable for interfolding wax papers, glassines, butcher wraps, delicatessen papers and others. Write for complete information on any of these popular Hudson Sharp machines that are continuously increasing converting production throughout the industry.



Putting Ideas to Work

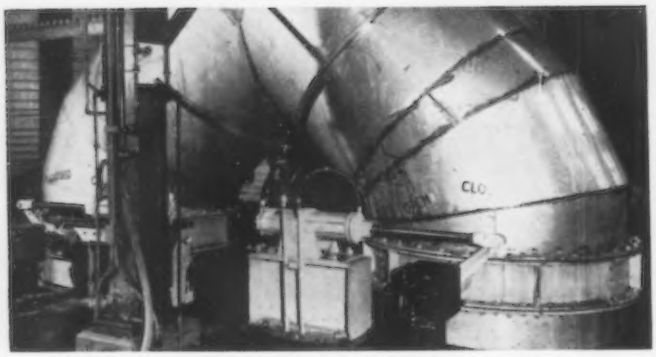
FOOD MACHINERY AND CHEMICAL CORPORATION

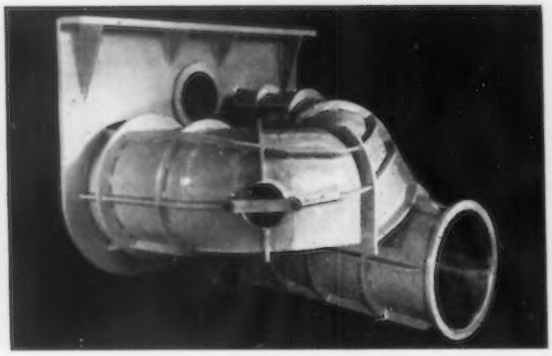
FMC Packaging Machinery Division

Hudson-Sharp Machine Company

1201 MAIN STREET, GREEN BAY, WISCONSIN

How to cut controllable costs with Armco ELC Stainless Steels



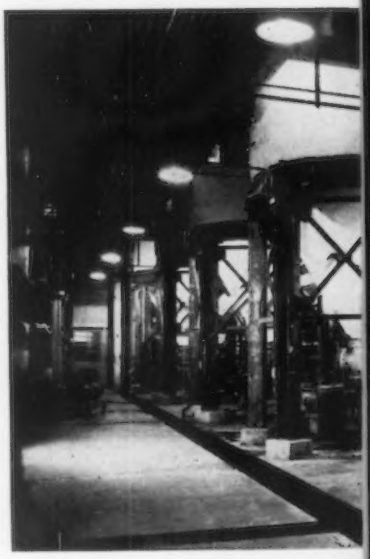


Armco Extra-Low Carbon Stainless Steels enable you to:
1. Reduce first cost of welded equipment.
2. Keep maintenance expense at a minimum.

First cost of equipment made of Armco 304 L, 316 L or 317 L is lower because you can make full use of economical weldments. You can assemble or attach by field welding without danger of harmful carbide precipitation. You also eliminate the cost of annealing or using stabilized stainless grades for welded structures that will operate at 800 F or below.

Maintenance costs are lower not only because intergranular corrosion due to welding is eliminated but because repairs or modifications can be quickly and simply done by welding on the job. Costly downtime is reduced.

In pulp and paper-making plants, for all kinds of corrosion-resisting equipment, Armco Extra-Low Carbon Stainless Steels have helped cut controllable costs. Let us send you our booklet, *How Armco Stainless Steels Improve Pulp, Paper and Profit*, that shows where and why. Just write us or call your Distributor of Armco Stainless Steels for a free copy. **Armco Division, Armco Steel Corporation, 1821 Curtis Street, Middletown, Ohio.**



ARMCO **Armco Division**

New steels are born at Armco

Get Armco Stainless Steels from these Steel Service Centers

(A) Sheets, Strip and Plates (B) Bars and Wire

AMERICAN STEEL & ALUMINUM CORP. (AB)
Hartford, Conn.

AMERICAN STEEL & ALUMINUM CORP. OF MASS. (AB)
Cambridge, Mass.

BROWN-WALES COMPANY (AB)
Cambridge, Mass. – Auburn, Maine – Worcester, Mass.

CENTRAL STEEL & WIRE COMPANY (AB)
Chicago, Ill. – Cincinnati – Detroit – Milwaukee

CHICAGO STEEL SERVICE COMPANY (AB)
Chicago, Ill.

CLEVELAND TOOL & SUPPLY COMPANY (B)
Cleveland, Ohio

THE CONGDON AND CARPENTER COMPANY (AB)
Providence, R. I. – Fall River, Mass.

C. A. CROSTA, INC. (A)
Denver, Colo.

DUCOMMUN METALS & SUPPLY COMPANY (AB)
Los Angeles, Calif. – Berkeley – Phoenix – San Diego – Seattle

EDGCOMB STEEL & ALUMINUM CORP. (AB)
Hillside, N. J.

EDGCOMB STEEL COMPANY (AB)
Philadelphia, Pa. – Charlotte, N. C. – Greensboro, N. C. – York, Pa.

ESCO CORPORATION (AB)
Portland, Oregon – Denver – Emeryville, Calif. – Eugene, Oregon – Honolulu – Los Angeles – Seattle – Spokane – Vancouver, B. C.

PETER A. FRASSE & COMPANY, INC. (AB)
New York, N. Y. – Buffalo – Hartford – Lyndhurst, N. J. – Philadelphia – Syracuse

FIRTH BROWN STEELS LTD. (AB)
Montreal, P. Q. – Toronto

GATE CITY STEEL, INC.—OMAHA (A)
Omaha, Nebr.

INDUSTRIAL STAINLESS STEELS, INC. (B)
Cambridge, Mass. – Buffalo, N. Y.

EARLE M. JORGENSEN COMPANY (AB)
Los Angeles, Calif. – Dallas – Denver – Honolulu – Houston – Oakland – Phoenix – Seattle – Tulsa – Wichita

MAPES & SPROWL STEEL COMPANY (AB)
Union, N. J.

METAL GOODS CORPORATION (AB)
St. Louis, Mo. – Dallas – Denver – Houston – Memphis – New Orleans – N. Kansas City, Mo. – Tulsa – Wichita

MONCRIEF-LENOIR MFG. COMPANY (AB)
Houston, Texas – Dallas – Harlingen – Lubbock – San Antonio – Temple

MORRISON STEEL COMPANY (AB)
New Brunswick, N. J.

THE ORLEANS STEEL PRODUCTS COMPANY, INC. (A)
New Orleans, La.

WILLIAM M. ORR COMPANY, INC. (AB)
Pittsburgh, Pa.

PAPER-CALMENSON & COMPANY (A)
St. Paul, Minn.

RICHARDS & CONOVER STEEL & SUPPLY COMPANY (A)
Kansas City, Mo.

SEABOARD STEEL & IRON CORP. (B)
Baltimore, Md.

SENECA STEEL SERVICE, INC. (AB)
Buffalo, N. Y.

SOUTHER STEEL & ALUMINUM COMPANY (A)
St. Louis, Mo.

J. M. TULL METAL & SUPPLY CO., INC. (AB)
Atlanta, Ga. – Birmingham – Greenville, S. C. – Jacksonville – Miami – Tampa

VIKING STEEL COMPANY (AB)
Cleveland, Ohio

VORYS BROTHERS, INC. (AB)
Columbus, Ohio

YORK CORRUGATING COMPANY (A)
York, Pa. – Washington, D. C.

Stainless Steel

For durability, strength, economy

PJT NEW LITERATURE

Adhesives For Paper Coating

Revises Monograph No. 9 of the same title published in 1952, prepared under the direction of TAPPI Coating Committee. Contains ten chapters dealing with the principles of adhesion, the manufacture of synthetic latices, styrene-butadiene latices, acrylic binders in paper and paperboard coatings, the butadiene-acrylonitrile latices, casein in paper coating, isolated soy proteins, and animal glue in coated papers. The higher level of our knowledge of this chemical phase of paper coating technology is strikingly revealed as one reads this new edition and then compares it with Monograph No. 9, its predecessor. Available at $3.00 per copy, TAPPI, 360 Lexington Ave., New York 17, N. Y.

Coragum FD

Explains that the FD following the famous Coragum Brand name means the product has been flash-dried by a special manufacturing process . . . to produce a more uniform adhesive base. Business-envelope size brochure. Industrial Division, Corn Products Sales Co., 10 East 56th St., New York 22, N. Y.

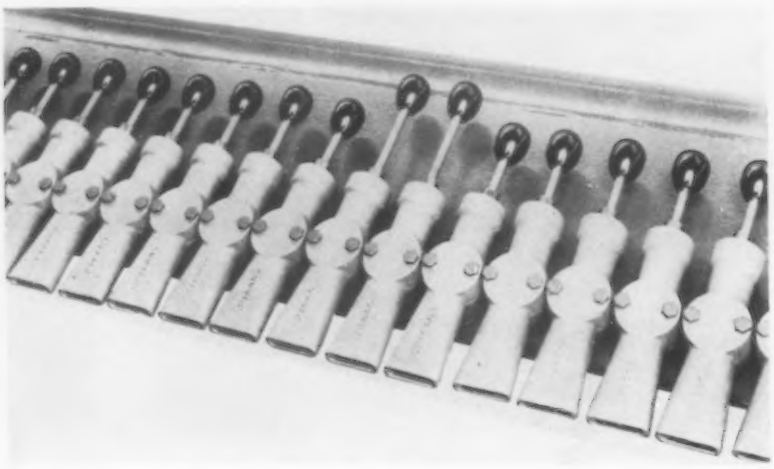
Bitusize "B" Emulsified Asphalt

Describes a highly stable liquid emulsion made from selected and specially processed asphalts. Recommends it for use as a paperboard and structural insulation board sizing where water resistance is desired. Explains how it is used and points out the advantages—savings through improved production; less time lost due to delays, slow-downs, and shut-downs; ability to size at higher levels than with conventional size; and lower cost than other types at all sizing levels. Booklet B-30. American Bitumuls & Asphalt Co., 320 Market St., San Francisco 20, Calif.

Plastics Products for Laboratory and Plant

Covers items ranging from instrument dust covers (flexible vinyl or rigid acetate), protective garments, and heavy duty nonbreakable laboratory supplies. Shows hundreds of plastic vessels, fittings, safety coverings, dispensers, containers and graduates. Many safety applications and time saving ideas will come to mind as you glance through this book. Testing Machines, Inc., 72 Jericho Turnpike, Mineola, N. Y.

NEW EQUIPMENT & SUPPLIES



Air Doctors "Chill-In" Sheet Caliper

A method to "doctor" the caliper of the sheet on paper machine calender rolls has been perfected by Lodding Engineering Corp., Auburn, Mass. Lodding's sheet caliper control doctor operates on the principle of directing controlled amounts of chilled air to any section or sections of the calender roll through a series of independently regulated valves that are positioned adjacent to one another across the full width of the roll. The caliper of any part of the sheet is controlled by opening the necessary valve or valves. This directs chilled air to the desired portion of the roll which shrinks it slightly, thereby increasing the caliper of the sheet at that point. In this manner, by simply regulating the valve openings, precise control over the sheet caliper is maintained.

Sheet caliper control units can be installed independently or as a part of a new doctor installation. When made a part of a conventional doctor, the doctor back serves as an air plenum.

The valves are mounted along the face of the sheet caliper control doctor at intervals of two inches. When a valve is opened, air is blown through an aluminum nozzle at a design velocity of approximately 12,000 f.p.m. The high air velocity produced by this nozzle, together with the narrow air stream, results in efficient cooling of the correct spot on the roll. Each nozzle will consume approximately 39 c.f.m. of air at this design velocity.

The air supply may be cooled artificially from water coils or mechanical refrigeration units or may be drawn from cooler basement areas. The usual air operating temperature is 60°, however, it should be remembered that greatest efficiency is obtained with the greatest temperature difference between the air and roll.

Sheet caliper control doctors are thoroughly field tested. Many units are now operating successfully under widely varying conditions. The largest unit installed to date is on a calender having a face width of 228 inches.

Adhesive Binds Polyurethane Foam to Bag Paper

According to Frank D. Andruss, president, the Alco Oil & Chemical Corp. (Trenton Ave. & William St., Philadelphia) has introduced a variety of quality adhesive compounds based on acrylic interpolymer latexes that provide adhesives specifically developed for the binding of polyether or polyester foams to various types of paper. The adhesives may find particular advantage in, for instance, insulated bags.

The advantages of Alco's foam-to-fabric adhesives are said to include the fact that there is no foam loss as in fusion processes, no outlay for special equipment, a more flexible hand for the finished product and the possibility of doing piece goods and odd sizes. Only small quantities are required for a successful lamination.

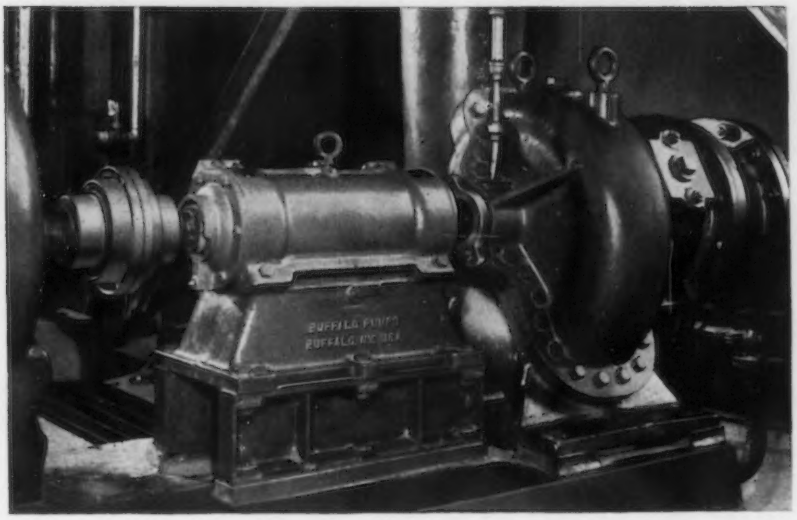
The requirements of the finished product will, of course, determine both the method of application and the desired viscosity to be selected. The recommended heat treatment time and temperature is 3 to 10 minutes at 280 to 300°F. All adhesives are applied directly to the polyurethane foam by either spraying, roller coating, striping or rotogravure printing procedures and the adhesives can be modified in many respects to meet special requirements and processing equipment.

Electronic Control Station Smallest of Its Type

An electronic manual-automatic control station, believed to be the smallest of its type in the industry, is available from Republic Flow Meters Co. The type AMA control station requires less than 17 square inches of panel space and weighs only 34 ounces. Measuring 5⅜ by 3⅛ inches in front and 6⅞ by 3⅛ inches in the rear, the units are designed to be installed side by side with 1-inch vertical clearance.

Designed for use in electronic systems to provide a visual indication of system response, the control sta-

PUSHING PAPER PRODUCTION



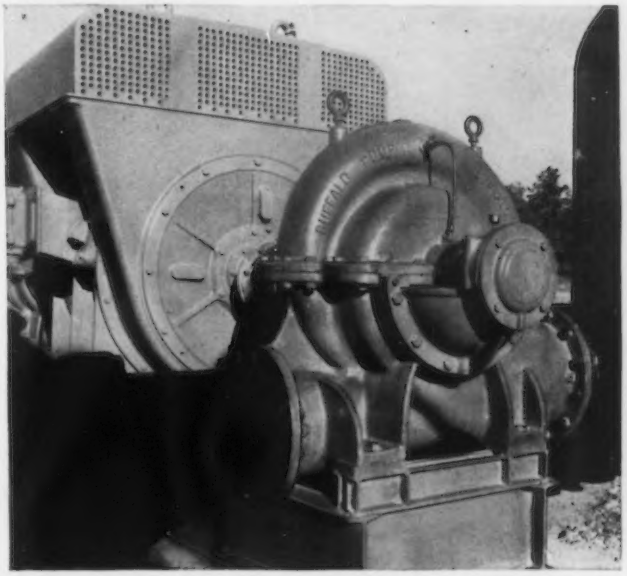
'BUFFALO' STOCK PUMPS

Handle high consistency stock without clogging. Keep production up, downtime down! All internal parts accessible without disconnecting piping. Full interchangeability of parts. Taper-bored impeller, heavy-duty water cooled bearing withstands severe loads. Request Bulletin 953.

WITH 'BUFFALO' PUMPS

'BUFFALO' DOUBLE SUCTION PUMPS

For high efficiency pumping of clear water, white water and liquor. Split casing for inspection of impeller without disconnecting piping. Horizontal or vertical construction. Motor or steam turbine drive. Capacities: to 18,000 gpm. Head: to 400 feet. Request Bulletin 955.



"Buffalo" PUMPS

BUFFALO PUMPS
Division of Buffalo Forge Co.
Buffalo, New York
Canada Pumps Ltd., Kitchener, Ontario

'Buffalo' Air Handling Equipment to move, heat, cool, dehumidify and clean air and other gases.

'Buffalo' Machine Tools to drill, punch, shear, bend, slit, notch and cope for production or plant maintenance.

'Buffalo' Centrifugal Pumps to handle most liquids and slurries under a variety of conditions.

Squier Machinery to process sugar cane, coffee and rice. Special processing machinery for chemicals.

LODDING
Engineering Corporation
AUBURN, MASSACHUSETTS

- DOCTORS—BLADES
- HYDRAULIC OSCILLATION
- **JET AIR** FUZZ REMOVERS
- **NO SPIT** STEAM SHOWERS
- **SELF CLEANING** SHOWERS
- FRESH WATER SHOWERS
- FOURDRINIER WIRE DOCTORS

Represented by

W. E. Greene Corporation
Woolworth Bldg., New York 7, N.Y.

C. S. Connington
Barre, Mass.

Buffalo Rubber & Supply, Inc.
526 Niagara St., Buffalo 1, N.Y.

E. C. Jacobi–H. D. Wake–P. R. Bruce
746 So. Quincy St., Green Bay, Wisc.

William P. Dapses
2055 Lansing Ave., Salem, Oregon

Pulp & Paper Mill Accessories Ltd.
Box 850 St. Laurent, Montreal 9, Que.

E & M Lamort Fils
Vitry-le-Francois (Marne) France

Joseph Winterburn Ltd.
Bury, Lancs., England

Cady Exact Dead Weight Micrometer

BUILT FOR PRECISE TESTING

Cadytest Instruments are designed for accuracy in determining or comparing thicknesses, basis weights, or bursting strengths. They are available in stock models, or specials for specific tasks.

Write for Brochure & Prices

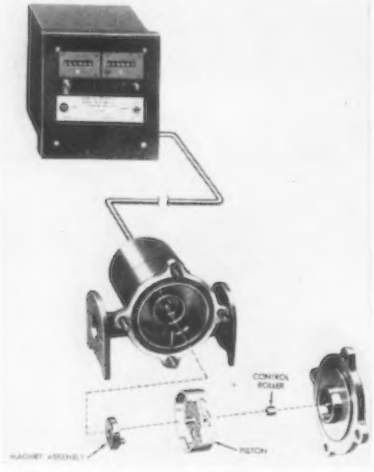
E. J. Cady & Company
Manufacturers
676 N. Harlem
River Forest, Ill.

Cady Burst Tester with Automatic Uniform Cycle

tion also selects either the manual or automatic control function. A single-pointer indicator gauge with a $1\frac{1}{8}$-inch dial and a two-position, momentary-contact pushbutton provide for readouts of final drive position and set point voltage. In the neutral position, the pushbutton indicates final drive position; when engaged, it shows set point voltage. Other features such as manual biasing of set point and indication of measured variable are available. Republic Flow Meters Co., 2240 Diversey Parkway, Chicago 47, Ill.

Non-Corrosive Flow Meters with Remote Read-Out

Stainless steel meters with oscillating piston have been developed by the Industrial Products Division of Badger Meter Manufacturing Co., 4545 West Brown Deer Rd., Milwaukee, Wis., to measure the flow of liquids that would corrode other metals. With the use of an oscillating



piston and magnetic drive, all the metered liquid is confined within the measuring chamber. The piston, magnet assembly, and control roller —only moving parts that come in contact with the liquid—are inert to a wide variety of liquids. Pistons for the meters are available in several different materials especially selected for certain types of liquids.

The oscillating motion of the piston is transmitted by means of a magnetic couple through the walls of the measuring chamber to a bronze gear train which powers the meter's reading device. Since the meter has no packing gland, none of the liquid can seep out of the measuring chamber to corrode the gear train.

The stainless steel meters come in one-inch and two-inch sizes with several different types of reading devices. The one-inch size can be installed with either a Remote Read-Out or a Remote Repeat Batch Controller, both new products of Badger Meter.

Two-inch meters can be used with the remote batch control or any of three different reading devices attached to the meter. These include (1) a read-out with continuous totalizer to 10 million gallons, (2) another with continuous and reset totalizers, and (3) the Electro-Batch with manual preset for batching liquids.

NEWSPRINT ROLLS ride safely in safe-cargo equipped cars, says one shipper Kimberly-Clark Corp. of Niagara Falls, New York. Smooth floors and walls to prevent chaffing and snagging, especially to the paper roll ends are essential to shipping rolls. Safe-Cargo cars meet these requirements and are said to have the added advantage of providing hundreds of anchoring stations for a strapping in all types of loads. A minimum of dunnage is required and the cars can be loaded and unloaded quicker. Safe-Cargo cars eliminate the need for strapping cleats, thus reducing the chances of scarfing and snagging. There is no limit to the number of anchoring stations that can be installed, installation is fast and allows for flush walls. For more information write Youngstown Steel Car Corp., Dept. PS-1, Niles, Ohio.

Testing Equipment Made Available by PS Tape Council

The Pressure Sensitive Tape Council announces a program making available equipment for use in testing pressure sensitive tapes. For the first time testing laboratories can now purchase the special equipment. This equipment meets the requirements of the test methods developed by the Pressure Sensitive Tape Council. It also conforms to ASTM and Federal Specifications. Test units may be obtained from the Tape Council's offices, 1201 Waukegan

EFFICIENCY

in quantity . . . in quality of refined pulp

The World Famous

36-2 "SPROUT"

single disc precision pulp refiner

The 36-2 Sprout is the most efficient disc refiner *in quantity of output and in quality of refined pulp* per horsepower input. It is preferred throughout the industry for every pulping application where rubbing and brushing action, without cutting, is required.

Sprout-Waldron units lead the field in the refining of semichemical pulp, cold caustic pulp, screen rejects, wastepaper stock; brown stock and hot stock refining of high yield kraft pulp; refining of bagasse, flax and straw pulping; as well as preparation of insulation and hardboard fiber.

Write for Bulletin 96-C for the latest details on the 36-2 Sprout.

11 POINTS OF SUPERIORITY

1—The most rugged built.

2—Uniform, unrestricted feed—means constant, continuous motor loads.

3—Assured parallel plate operation through 3 point suspension tramming.

4—Peripheral control ring for greater refining control.

5—Top tension bar for balanced machine stresses.

6—Kingsbury thrust bearings for refiners with 600 to 1500 horsepower, inclusive.

7—Precision manufacture—with sensitive, close tolerance adjustments.

8—Integral oiling system.

9—Swinghead design for simplified plate changing.

10—High production with efficient, full utilization of connected power.

11—Proved to give minimum maintenance.

SPROUT, WALDRON & CO., INC.

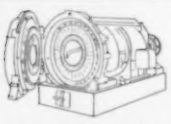
MUNCY, PENNSYLVANIA, U. S. A.

610

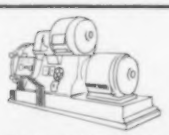
Refiners • Conveyors • Feeders • Screens • Mixers • Drainers • Fibre Presses • Stock Proportioners

SW SINCE 1866

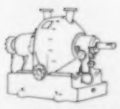
MORE SPROUT DISC REFINERS ARE SOLD THAN ANY OTHER MAKE

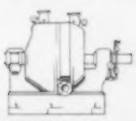


36-1 • REFINERS • 36-2

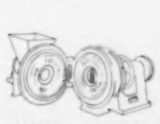


DOUBLE DISC REFINERS





20"-34" • PRESSURIZED REFINERS • 42"



LABORATORY REFINERS

Road, Glenview, Ill. This equipment includes:

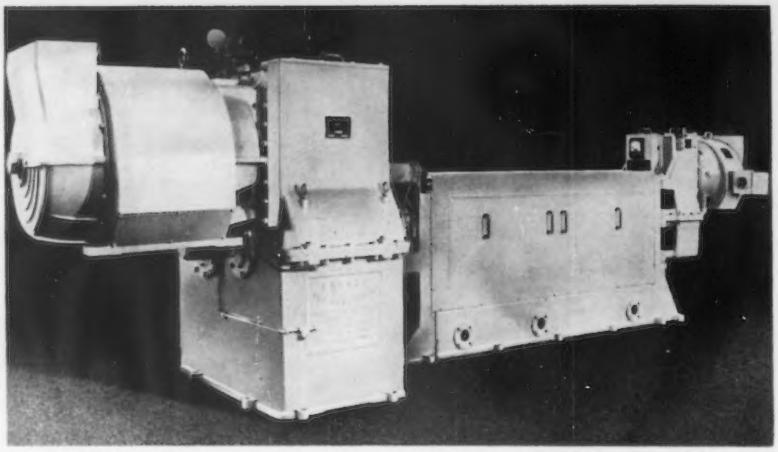
The moisture vapor transmission dish is used in testing the moisture vapor transmission rate of pressure-sensitive tapes, particularly against government packaging specifications. It is made of cast aluminum and is considered a satisfactory equivalent to brass.

The Quick-Stick test jig is a specialty item developed by the Council to measure the ability of pressure-sensitive tapes to stick instantly under only their own pressure.

The adhesion plates come in two sizes: 2 x 5 inches and 2 x 6 inches. They are made of Type 302 stainless steel ground in a lengthwise direction to between 12-16 micro-inches with the polished surface masked.

The unwind tester fits in the standard tensile testing machine in such a way that the unwind of tape can be determined by testing machines at the standard 12 inches per minute rate of removal. It also can be secured in a vise for testing unwind adhesion at higher speeds by hand.

The cut-off jig enables a 90-degree cut-off of tape lengths for use in testing. It features an easily replaceable razor blade.

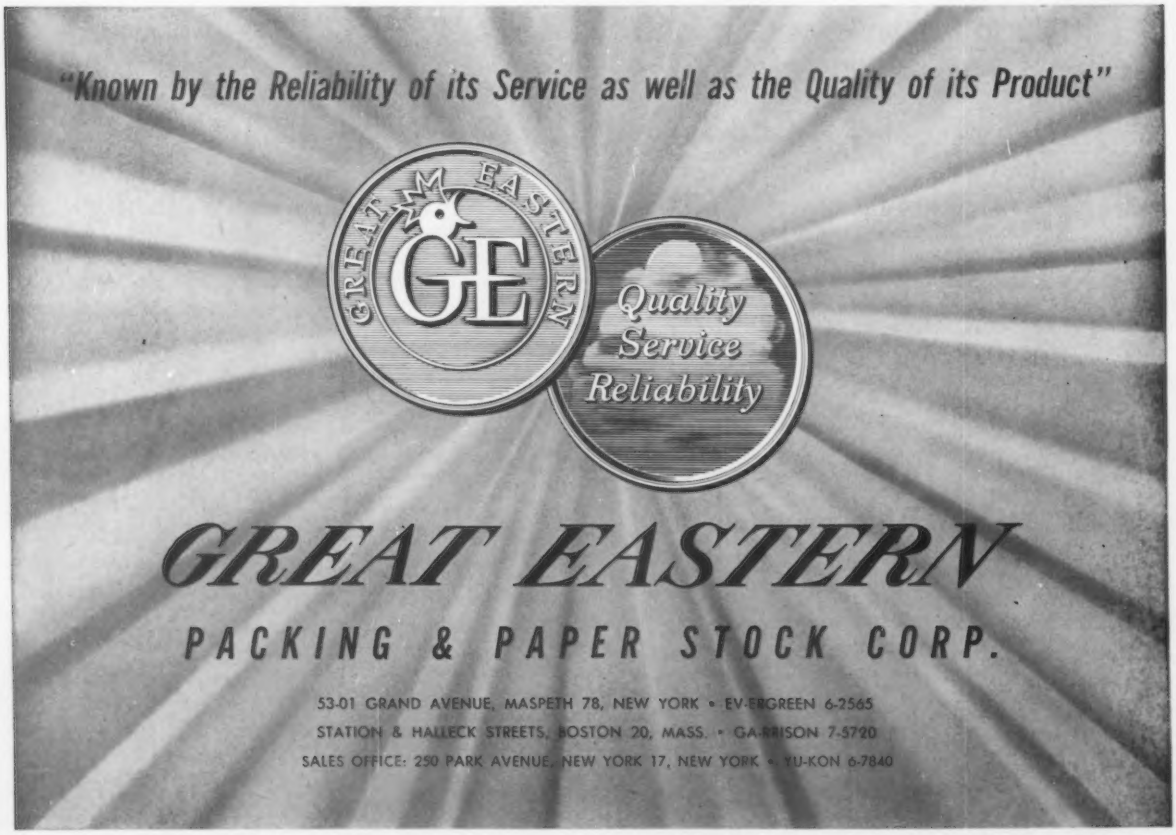


Two Stage Screw Press Permits Chemical Recovery

Shaft parts and drainage bars on the Refiner Screw Press, designed and built by the French Oil Mill Machinery Co., Piqua, Ohio, are said to be corrosion-resistant and abrasion resistant under the severest operating conditions.

Stainless steel shaft parts are hard-coated with stellite. Inspection is facilitated by cage covers which open up to provide easy access to normal wearing parts. A patented feature is removable skeleton inserts in the drainage cage which enables the operator to remove an insert and install a substitute in less than two hours time.

The French Refiner Screw Press is designed to express fluids, de-fiber and shred whole or cooked wood chips, and recover concentrated dissolved chemicals. It is estimated that the French Press when processing cooked wood chips decreases total refining power by as much as 10 to 20 percent, and permits a 20 to 25

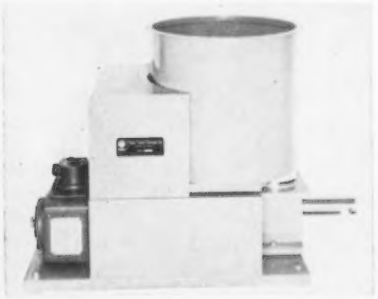

"Known by the Reliability of its Service as well as the Quality of its Product"
GREAT EASTERN
GE
Quality
Service
Reliability
GREAT EASTERN
PACKING & PAPER STOCK CORP.
53-01 GRAND AVENUE, MASPETH 78, NEW YORK • EV-ERGREEN 6-2565
STATION & HALLECK STREETS, BOSTON 20, MASS. • GA-RRISON 7-5720
SALES OFFICE: 250 PARK AVENUE, NEW YORK 17, NEW YORK • YU-KON 6-7840

percent increase in headbox freeness. In addition, the press's 77 inch barrel length insures up to 90 per cent liquor recovery as compared to 70 per cent recovery on smaller machines with short barrels.

The French Press also features a special water injection system which permits chemical extraction and recovery, followed by washing under pressure after materials have been partially dried. This two-stage pressing operation eliminates the need for smaller units connected via conveyor systems.

Feeder Hoppers Dry Materials By Vibrated Screw.

A solid materials feeder, which combines the hoppering action of the live bin with the metering accuracy of the vibrated rotating screw, is being marketed by Vibra Screw Feeders, Inc., 156 Huron Avenue,



Clifton, N. J. The feeder is claimed to maintain a metering accuracy better than one per cent and hoppers all dry materials without bridging or flooding.

The integral 3 cubic foot hopper can be extended readily to 5 or 8 cubic feet on the smaller sizes without loss of hoppering effectiveness. One basic machine is used for screw sizes from ¼ inch diameter to 4 inches diameter. Feed screws are interchangeable. Screws up to 2 inches use a ⅓ h.p. drive motor. The 3 and 4 inch screw sizes are interchangeable with one another and use a ½ h.p. motor. Depending on screw size, feed rates from 0-12 lbs./hr. (0.003 cu. ft./hr.) up to 8,400 lbs./hr. (200.0 cu. ft./hr.) are obtainable.

All contact parts can be removed for cleaning and washing. The feeder is equipped with a GE Polydyne transmission, which provides variable speed drive with a 10 to 1 speed range. The motor is equipped with a double-ended shaft, one end to drive the variable speed transmission, the other to drive the constant speed vibrator shafts for both the live bin and the screw trough.

Prices of Fibers

MARKET WOOD PULP

SECOND QUARTER CONTRACT PRICES PER SHORT AIR-DRY TON

Delivered Basis

	U.S.	Canadian	Swedish	Finnish	Norwegian
Groundwood	$82.50/ 90.00	$82.50/ 90.00	$90.00/ —	$90.00/ —	$90.00/ —
Bleached Gw'd.	97.50/100.00	97.50/100.00			
Kraft, Blchd.	‡140.00/150.00	‡140.00/150.00	150.00/ —	150.00/ —	150.00/ —
Kraft, Blchd. Hdwd.	135.00/140.00		140.00/ —		
Kraft, Semi-bleached.	130.00/140.00				
Kraft, Unbl.	117.50/125.00	125.00/ —	125.00/130.00	125.00/ —	
Sulphite, Blchd.	‡135.00/140.00	‡135.00/140.00	140.00/ —	140.00/ —	140.00/ —
Sulphite, Bl. Hdwd.	135.00/ —				
Sulphite, Unblchd.	125.00/ —	125.00/ —	125.00/ —	125.00/ —	125.00/ —
Sulphite, Unb'l. Gl'sn.		140.00/ —	134.00/ —		
Soda, Blchd.	130.00/135.00	130.00/135.00			

‡ Depending on Brightness.

COTTON LINTERS

F.O.B. OIL MILLS PER CWT
WEEK ENDED APRIL 4

	Atlanta	Memphis	Dallas	Los Angeles
Grade 1	n.a.	n.a.	n.a.	n.a.
2	n.a.	n.a.	n.a.	8.00/7.50
3	$7.25/6.75	$7.50/7.25	$7.50/7.00	7.25/6.75
4	6.75/6.00	6.50/6.25	6.50/6.25	6.50/6.25
5	6.00/5.50	5.75/5.50	6.00/5.50	5.75/5.50
6	5.50/4.50	5.25/5.00	5.25/5.00	4.50/4.25
7	4.50/4.00	4.25/4.00	4.75/4.00	n.a.

WASTE PAPER MARKET

Mill Prices, f.o.b. Trucks Shipping Point — Includes Brokerage

These quotations are a partial indication of the price range on volume tonnage in each market on the date specified, as gathered from major dealers and brokers. SPECIAL PACKINGS AND SPOT TONNAGE NOT INCLUDED. Prices nominal.

	New York	Boston	Chicago	Los Angeles
	April 10	April 10	April	April
No. 1 Mixed Paper	$ 7.00/ 9.00	4.00/ 7.00	6.00/ —	12.00/ —
No. 1 News	12.00/ 13.00	11.00/ —	11.00/ —	15.00/ —
Overissue News (Lg. size)	11.00/ 13.00	9.00/ 11.00	16.00/ —	18.00/ —
Mill Wrappers	19.00/ 22.00	9.00/ 11.00	9.00/ —	13.00/ —
Old Corrugated Containers	17.00/ 18.00	15.00/ 16.00	18.00/ —	16.00/ —
Super Resorted Kraft Paper	35.00/ 40.00	— / —	28.00/ —	50.00/ —
New Double Kr. Ld. Corr. Cuts	27.50/ 30.00	30.00/ 32.50	30.00/ —	27.50/ —
(Semi-chem. medium)	45.00/ —	45.00/ —	42.50/ —	— / —
New 100% Kraft Corr. Cuts	40.00/ 42.50	— / —	52.50/ —	— / —
New Br. Kraft, Env. Cuts	65.00/ 70.00	65.00/ 70.00	47.50/ —	45.00/ —
New Br. Kr. Bag Waste Prntd.	50.00/ 55.00	50.00/ 60.00	47.50/ —	35.00/ —
New Br. Kr. Bag Waste Unprintd.	55.00/ 60.00	60.00/ 65.00	55.00/ —	42.50/ —
No. 1 Groundwood Shvs.	25.00/ 30.00	20.00/ 25.00	10.00/ —	27.50/ 30.00
White Newsblanks	42.50/ 45.00	35.00/ 40.00	30.00/ —	55.00/ —
No. 1 Soft White Shvs.	55.00/ 60.00	55.00/ 60.00	50.00/ —	75.00/ —
Super Soft White Shvs.	65.00/ 75.00	70.00/ 80.00	60.00/ —	— / —
Hd. White Shvs.	75.00/ 80.00	80.00/ 90.00	75.00/ —	80.00/ —
Hd. White Env. Cuts	90.00/ 95.00	100.00/105.00	80.00/ —	103.00/ —
Col. Tab. Cards	40.00/ 42.50	40.00/ 42.50	35.00/ —	35.00/ —
Manila Tab. Cards	57.50/ 60.00	55.00/ 60.00	55.00/ —	65.00/ —
No. 1 Col. Ledger	32.50/ 35.00	30.00/ 35.00	35.00/ —	18.00/ —
White Ledger	45.00/ 50.00	42.00/ 47.00	45.00/ —	40.00/ —
Mixed Book & Mag.†	— / —	— / —	8.00/ —	— / —
No. 1 Books‡	15.00/ 17.50	18.00/ 22.00	22.50/ —	8.00/ —

† Includes Time & Life; no coarse groundwood. ‡ Not to exceed 10% of groundwood.

PJT NEWS OF SUPPLIERS

P. A. Peterson

W. L. Ayers

Rice Barton Corp., Worcester, Mass., has announced the appointment of Philip A. Peterson as chief engineer in charge of trailing blade coater ranges.

Charles S. Barton, president, stated that use of trailing blade coaters has expanded to the point of requiring a separate department. Mr. Peterson is a specialist in coating methods and equipment and will be responsible for both engineering and sales.

Prior to this appointment Mr. Peterson has been a sales engineer. He joined Rice Barton in 1951 after 4 years with Oxford Paper Co.

Also announced is the appointment of W. Lewis Ayers as sales engineer for Rice Barton.

Mr. Barton stated that this further move in Rice Barton's program to provide better service for paper mills is made necessary by more activity in the northeast. Mr. Ayers will cover Maine, New Hampshire and Vermont from the Worcester sales office.

Prior to this appointment Mr. Ayers has served in the engineering, estimating and internal sales departments. He joined Rice Barton in 1948.

CIBA Co., Inc., Fair Lawn, N. J., has appointed A. L. Perrin as manager of the company's Midwest district. The appointment was effective March 1, the date on which J. Gordon Stott retired from CIBA after 40 years of service.

Mr. Stott joined CIBA early in 1921, starting in Greensboro, N. C., where the company at one time maintained an office.

Mr. Perrin, born in New York City and a Yale graduate, started his career with the company in 1948 with CIBA, Ltd., Basle, Switzerland.

Shawinigan Resins Corp., Springfield, Mass., has announced three executive appointments in its research department and the elevation of five persons to research section leader posts.

Effective immediately, Edward Lavin is director of applications research; Aubrey F. Price is director of product research; and, Harold D. Weymouth is director of research administration and planning.

Those appointed section leaders include: Albert H. Markhart, Leo J. Monaghan, Ralph F. Nickerson, Forrest H. Norris, and Herbert Terry. The appointments are effective immediately.

Lock Joint Pipe Co., East Orange, N.J., has acquired Corroplast, Inc., Passaic, N.J., in an exchange of stock. Corroplast is an extruder of rigid PVC (polyvinyl chloride) pipe, sheet, rod and shapes.

Corroplast's products are currently used in a number of basic industries, including chemicals, foods, paper, and mining. According to Allan M. Hirsh, Jr., Lock Joint Pipe's president, the company will develop these products for use in the irrigation, sanitary, and water supply industries.

Corroplast, which will operate as a wholly owned subsidiary, is the second company to be brought into Lock Joint Pipe's recently formed Plastics Division. In February of this year, Lock Joint acquired Electro Chemical Engineering & Manufacturing Co. of Emmaus, Pa., manufacturers of corrosion resistant construction materials in the form of coatings, linings, and adhesives.

"Rag content on the last batch was too low!"

D. A. King

D. Macfarlan

Pennsalt Chemicals of Philadelphia, in a reorganization of its inorganic chemicals marketing group, has announced the appointment of Donald Macfarlan to the post of sales manager—inorganic chemicals. At the same time Donald A. King was named product manager—inorganic chemicals.

The new organization is designed to streamline the handling of marketing problems for the company's line of inorganic chemicals. The company's organic chemicals marketing organization was modified in a similar move in January 1960.

Mr. Macfarlan will have general responsibility for the marketing of all inorganic products and, in addition, specific responsibility for the handling of caustic soda, caustic potash, hydrofluoric acid, bulk chlorine, aluminas and alum.

Mr. King assumes responsibility for handling ammonia, hydrogen peroxide, cryolite, ferric chloride, cylinder chlorine, ammonium and potassium persulfates, and nitric, sulfuric and muriatic acids.

Air Power Equipment Corp., St. Paul, has been appointed sales representative for Hills-McCanna metering and proportioning pumps throughout the entire state of Minnesota and western counties of Wisconsin. Company headquarters are 2631 University Ave., St. Paul. A branch office is maintained in Duluth.

The pumps, manufactured by Hills-McCanna Co., Chicago, are broadly used throughout the chemical processing, petroleum, and pulp and paper industries for handling chemicals, and also in power plants and industry for boiler feed water treatment.

Black-Clawson Co. announces that Bernard J. Koziol has taken up an assignment with the company's Black-Clawson International Ltd. Division as manager of paper machine sales. He will make his headquarters in the general offices of BCI in London, England.

For the past two years, Mr. Koziol

B. J. Koziol

Rolf Klippert

has served in the staff sales group of Black-Clawson as coordinator of package projects involving the sale and engineering of products from more than one division. His activity in staff sales was centered at the Black-Clawson Paper Machine Division, Watertown, N. Y.

Mr. Koziol, a graduate mechanical engineer, first joined Black-Clawson in April 1946. Subsequently he was plant engineer at two mills of St. Regis Paper Co. and general manager of Fibre Forming Div., Arvey Corp. He rejoined Black-Clawson in 1957.

Buffalo Forge Co. has named Rolf Klippert to represent it in the Tampa, Fla., sales district for both the Air Handling and Centrifugal Pumps Division. A graduate of Case Technical Institute and Ohio State University, he was employed in the company engineering department and later as a Buffalo, N. Y., sales representative.

Mr. Klippert will headquarter at 4302 Henderson Boulevard, Suite 110A Austin Building, Tampa 9. Fla.

Food Machinery and Chemical Corp., New York., N.Y., has named Robert E. Cochran assistant manager of sales for its Chlor-Alkali Division. Formerly alkali product manager, he will be replaced by Richard M. Hoyer.

In his new assignment, Mr. Cochran will direct the division's field sales force. Since joining FMC in 1955, he has served in both sales and administrative positions. He is a graduate in economics and psychology from Colgate University.

Mr. Hoyer joined the Chlor-Alkali Division as a sales manager of the southern district in 1951. He is a graduate in chemistry from Purdue University.

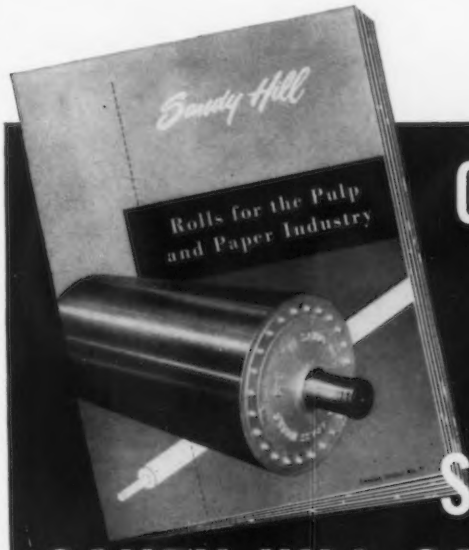
The Chlor-Alkali Division's principal products are alkalis, ammonia, chlorine, carbon bisulfide, carbon tetrachloride, soda ash and Dimazine (unsymmetrical dimethylhydrazine).

Dobeckmun Co., Cleveland, Ohio, a division of The Dow Chemical Co., has appointed three new regional sales managers. They are John E. Powers, New York region, Paul M. Smith, central region, and Robert J. Smith, northwest region.

Mr. Powers, a Dobeckmun sales representative for ten years and northwest regional sales manager since 1958, succeeds the late W. C. Dougan and will head district offices located in New York City and Skaneateles, N.Y.

Paul Smith, formerly assistant to the sales manager for Saran Wrap and Trycite products, replaces Robert A. Stump, who was recently promoted to director of sales training and selection. He will be responsible for Dobeckmun district offices in Cleveland, Cincinnati, Indianapolis, and Pittsburgh.

Robert Smith, who replaces Mr.



GET YOUR COPY OF "ROLLS" SECTION 7 SANDY HILL CATALOGUE

FOR THE PAPER INDUSTRY SANDY HILL PRODUCES:

Breast Rolls
Table Rolls
Fin Rolls
Wire Return Rolls
Lumpbreaker Rolls
Fly Rolls
Blow Rolls
Couch Rolls
Cylinder Moulds
Distributor Rolls
Felt Carrier Rolls
Granite Rolls
Dryers
Yankees
Cooling Cylinders
Dryer Felt Rolls
Spring Rolls
Reel Drums
Reel Spools
Miscellaneous Rolls
Also Roll Grinding and Rolls for other industries.

At Sandy Hill every operation in the manufacture of a paper machine roll is in the hands of able and experienced engineers and mechanics. These designers and builders are backed by the company's hundred year history of service to the paper industry.

Each paper machine roll is designed for its particular function in the papermaking process, and manufacturing operations conform to the highest standards to assure rolls of the finest quality.

THE SANDY HILL IRON AND BRASS WORKS
HUDSON FALLS, N. Y.

Powers, has been Chicago district manager for the past two years. He will be in charge of Dobeckmun district offices in Chicago, Detroit, Milwaukee and Minneapolis.

Corn Products Sales Co., manufacturer of starches, syrups, dextrose and corn-derived chemicals, has appointed David Miller industrial sales representative for the upstate New York area for the Industrial Division. The announcement was made by Cleo Mikel, district manager at the company's Buffalo office. Mr. Miller's headquarters will be at Albany, N.Y., and from there he will assist in servicing the industries in an important segment of New York State from Beacon to the Canadian border.

Hercules Powder Co. has announced construction of a new multimillion pound chemicals plant at its Hopewell, Va., facilities.

The new plant will manufacture hydroxyethylcellulose, a product which has shown rapid sales growth and potential in a variety of applications including paints, adhesives, binders, cosmetics, pharmaceuticals, petroleum, roofing tile, inks and printing pastes, ceramics and a number of additional miscellaneous uses.

Construction will begin immediately and the plant is expected to be in operation during the first quarter of 1962. The plant will be designed to allow for future expansion.

"Natrosol," Hercules trade name for hydroxyethylcellulose, has been made at Hopewell since 1959. The product is based on chemical cotton, a major product of this plant, which is also used at Hopewell for the manufacture of CMC (carboxymethylcellulose) and other cellulosic derivatives.

Robert Sloan

P. M. Jarabek

Albany Felt Co. has announced the appointment of Robert Sloan as manager of felt operations within the United States. He will assume responsibility for the St. Stephen, South Carolina and Hoosick Falls, N. Y., operations as well as serving as plant manager at Albany, N. Y. Wayne Fry will continue as plant manager of St. Stephen.

Mr. Sloan, after five years of manufacturing and supervisory experience at Albany Felt's mills at Hoosick Falls and Albany, was named plant manager of the St. Stephen operation in 1955. He held this position until early in 1959 when he returned north to serve as plant manager for the Albany and Hoosick Falls operations.

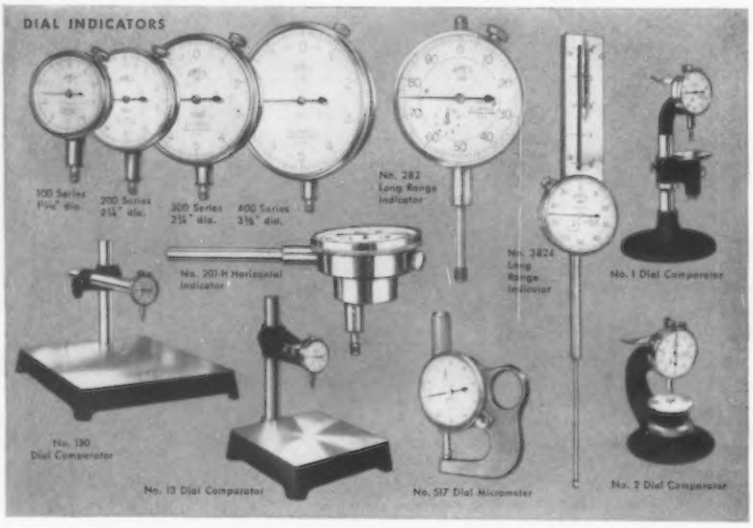
Walworth Co., a leading valve and fitting manufacturer, has appointed Paul M. Jarabek, manager of its newly formed Plastic (PVC) Valve & Fitting Division, with headquarters in Chicago. A salesman with the company for five years, Mr. Jarabek will be responsible for the coordination of promotional and sales activities relating to Walworth's PVC (polyvinyl chloride) line of valves and fittings.

Mr. Jarabek attended Morton Junior College, Cicero, Ill.; Wayne University, Detroit, Mich.; and the U.S. Naval Academy at Annapolis, Md. He was previously employed by Ceco Steel Products Corp. He is a member of the Society of Plastics Industry.

Chemical Construction Corp., New York, N.Y., has been awarded a contract for the design and engineering of a plant for the production of "iron free" liquid alum, by the Border Chemical Co., Ltd., Winnipeg, Canada.

The new plant, which is expected to be completed by June 1961, is to be located in Springfield Trascona, Man-

AMES *Masters of Measurement*



DIAL INDICATORS AND GAUGES

Use Them for Checking: taper, height, depth, flatness, roundness, straightness, thickness, diameter, length and size.

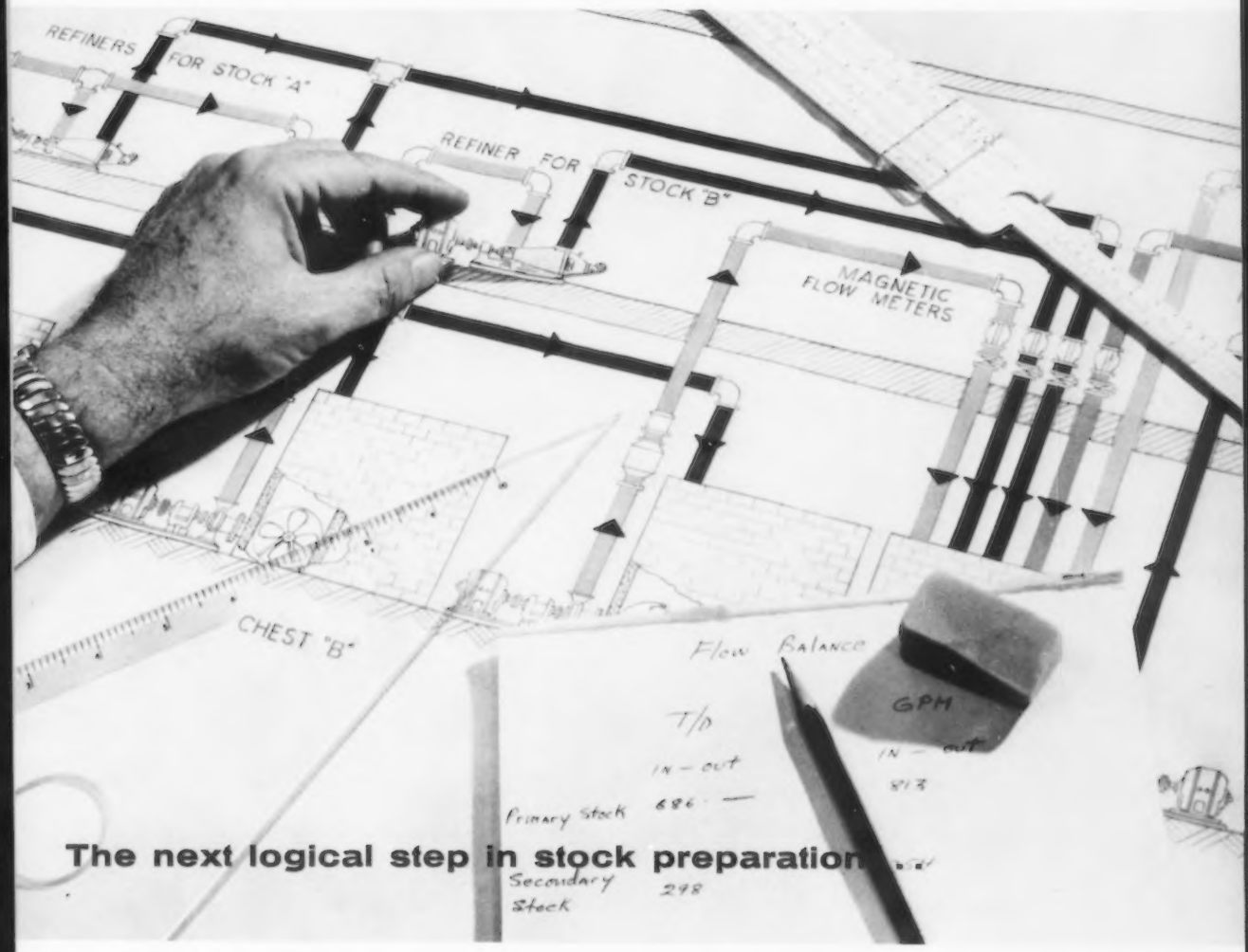
Features Include: easy-to-read dials, unbreakable crystals, forged cases, backs and wheel support, contour-lapped pinion teeth.

Attachments: rubber and metal dust guards, long stem indicators, tolerance hands, lift levers, special backs, contact points, etc.

For literally hundreds of measuring, indicating and comparing operations, you'll find Ames standard and customized gauges and indicators unerringly accurate and amazingly durable . . . *You're asking for the best when you specify Ames!*
B. C. AMES CO., Waltham 54, Mass. Representatives in Principal Cities—
In Canada, H. C. Burton Co., 166 Rebecca Street, Hamilton, Canada.

B.C. AMES CO.
MANUFACTURERS OF MICROMETER DIAL INDICATORS, DIAL GAUGES, ACCU-FLOW AIR GAGES, PORTABLE TRANSISTORIZED COMPARATORS

THE INTEGRATED STOCK PREPARATION SYSTEM



The next logical step in stock preparation . . .

For a number of years E. D. Jones has been working toward the concept of an *integrated* stock preparation system . . . a system where each separate component works in complete harmony with every other component to function as *one single machine.*

E. D. Jones is now ready to supply paper mills with integrated stock preparation systems, for either modernization programs or completely new mills. Custom designed in conjunction with mill personnel (including their chosen consultants) for specific applications, these systems offer the following unique advantages to forward-looking papermakers:

UNIT RESPONSIBILITY. One source for contract negotiations, liaison during manufacture, start-up assistance, and future systems service.

FASTER PROJECT IMPLEMENTATION, resulting in earlier start-up.

LOW EQUIPMENT COSTS, because major components are selected from the wide range of regularly manufactured Jones equipment — all competitively priced.

LOWER OPERATING COSTS, because of efficient, carefully matched, easy-to-maintain components.

GREATER FLEXIBILITY FOR THE FUTURE, because a JONES system is designed to meet tomorrow's requirements . . . as well as today's.

For further information, write to:

Systems Engineering Group
E. D. Jones Corporation
Pittsfield, Massachusetts

Canadian Associates:
The Alexander Fleck Ltd. • 75 Spencer Street, Ottawa

E. D. JONES CORP. member BELOIT group PITTSFIELD, MASS.

Jones

PULP MILL EQUIPMENT AND STOCK PREPARATION MACHINERY

THE SEVEN STEPS OF JONES SYSTEM ENGINEERING

1
Data Gathering

2
Establishing Specifications

3
Laying Out the System

4
Preparing the Proposal and Cost Estimate

5
Detailed Engineering and Supervision of Manufacture

6
Supporting Services

7
Training Mill Personnel and Start-Up of Systen

Step by step, Jones relies on a combination of thorough planning, competent engineering, and teamwork to design and produce stock preparation systems that meet the highest standards of performance and dependability.

DU PONT DYE SALESMEN OFFER NEW SERVICE: "ECONOMY CHECK" ON YOUR USE OF COLORS

How long since you've conscientiously set out to modernize the dye formulas in your mill? How long have you been using the same dyes to get that familiar pink or equally familiar yellow? Ten years? Fifteen years? Are you sure you're making colored paper the best, the most economical way?

Because so many paper mills haven't taken the time to review their formulas—and because it's likely that unnecessary expense and trouble can be eliminated by just such a review—Du Pont dye salesmen have launched their new "Economy Check" program.

Here's how this service plan works:

Without cost or obligation, Du Pont thoroughly reviews each of your dyeing formulas. If a less expensive dye will do as good a job as the one you're using, you'll be told about it. If a more costly dye will eliminate a problem that's costing you money in off-color lots, you'll be told about that, too. When the review is completed, you'll have the assurance that your dyeing formulas are up to date in every sense and that you're getting the "most dye for the dollar."

Already Du Pont salesmen have chalked up results in the "Economy Check" program:

Item—A mill had had repeated trouble with two-sidedness in using a given formula. In the course of an "Economy Check," the Du Pont salesman sent a paper sample back to Du Pont's Technical Laboratory where the shade was matched with different dyes. The two-sidedness headache was cured at no increase in cost.

Item—A paper mill had been using a particular red dye for some time with satisfactory results. The "Economy Check" turned up the fact that another red dye would do the job just as satisfactorily and at less cost.

Item—A mill had been turning out a particular yellow shade for years. The dyeing formula "just growed" and hadn't been questioned until a Du Pont salesman found that the shade could be matched with an improved formula at a saving to the mill of $16 a ton!

Ask your Du Pont salesman—or get in touch with the nearest Du Pont district office—to enjoy the benefits of an "Economy Check" on your dyeing operations. We can't guarantee a saving, obviously. Besides, the cheapest formulation isn't necessarily the best. But today, when cost reduction is so important, it's more vital than ever that you pass up no opportunity for economizing. Du Pont is pleased to offer you one of these opportunities.

John L. Ayres, right, Du Pont dye salesman in Pacific Northwest, launches "Economy Check" for a customer by having Du Pont lab review current color formulas. Plan can save money for mills. Johnny Ayres learned his trade during 13 years in dyes lab and 11 years as a Du Pont salesman.

news from Du Pont

3 EASY WAYS TO SOLVE COMMON DYEING PROBLEMS

If you dye mixed pulps or bleached furnishes, or produce heavy shades, you may notice a tendency toward bleeding or graniting. Du Pont supplies three dyeing assistants that can help you obtain better dyeing without changing to more expensive dyes.

Uneven dyeing or graniting

When dyeing mixed pulps with direct dyes, Du Pont Retarder LAN aids level dyeing and reduces graniting considerably. A small amount in the beater often permits lighter pastel shades to be produced, with the same direct dyes you're now using.

Bleeding or "dye burning"

Papers colored with acid or direct dyes sometimes bleed too much in the heavy shades, or suffer "dye burning" on the dryers, or become marked by the felt or dandy roll. "Insonite" dye fixing agent reduces these problems at small cost. Although it gives best results in surface applications, this agent can be added at the beater.

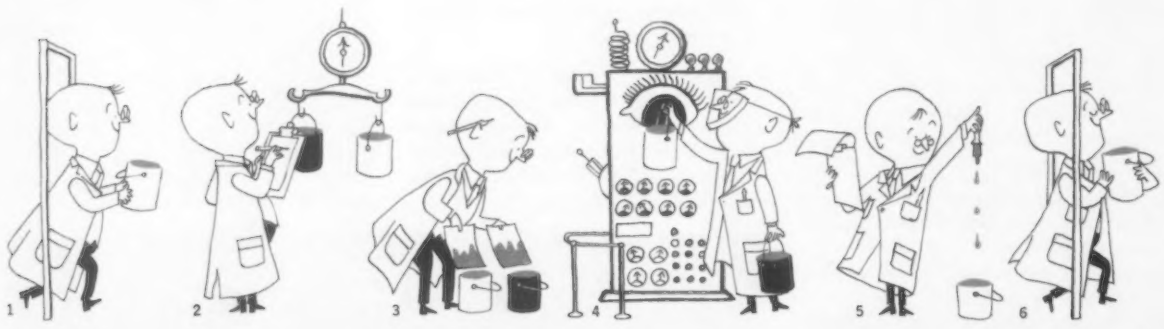
Water spotting or bleeding

These problems often occur when basic dyes are used to color bleached furnishes. Because of their affinity for such furnishes, the dyes may not set properly. Du Pont Mordant BS overcomes the problem, yet does not give the dulling effect of tannic acid. It is used with surface stained grades but can be applied in the beater.

VISITOR SEES DU PONT PUT DYES THROUGH 28 QUALITY CONTROL STEPS

After seeing Du Pont quality control in action, a recent visitor to the Technical Laboratory expressed amazement that any mill would jeopardize a run worth hundreds of dollars for the sake of saving a few cents in "bargain" dyes.

He followed the various crude charges in a dye lot through *28* separate steps. He saw how Du Pont checks and rechecks a dye lot against the standard . . . how three different technicians check each sample to guard against bias. This simplified drawing shows just the highlights of the entire quality control procedure.



(1) Technician takes sample to lab. (2) An equal weight of dye standard is prepared. (3) He makes hand sheets of sample and standard. (4) Accurate visual and photospectrometer comparisons are made. (5) Report is written . . . necessary corrections are made . . . all lab steps are repeated at several production stages. (6) Highly accurate dye batch is shipped to customer.

news from Du Pont

WHAT'S YOUR PAPER PROBLEM?

Du Pont offers broad and diversified lines of chemicals for all types of papers

Is your problem listed here? Check these items:	These, or related, chemicals and Du Pont experience could help you:
Bleaching	"Zepar"(T.M.) BP reducing agent
Bleed Fastness Improvement	
Acid, Direct Dyes	"Insonite"® dye fixing agent
Basic Dyes	Du Pont Mordant BS
De-inking Assistance	"Alkanol"® HCS surface active agent
Dye Fixing	Du Pont Mordant BS "Insonite"® dye fixing agent
Dye Leveling	Du Pont Retarder LAN
Felt Washing	"Alkanol"® HCS surface active agent "Duponol"® RA surface active agent
Graniting Retardation	Du Pont Retarder LAN
Linting Reduction on Printing Grades	"Zoron"(T.M.) WSP resin finish
Pulping Assistance	"Alkanol"® HCS surface active agent
Safety Paper Chlorine Indication	"Chlorostain"® N chlorine indicator
Starch Insolubilization	"Zoron"(T.M.) WSP resin finish
Wet Strength Imparting-surface Application	"Zoron"(T.M.) WSP resin finish

There's probably a Du Pont chemical that can help you. We offer a broad range of detergents, emulsifiers, resins, lubricants and specialty products such as water repellents, electrically-conductive chemicals, wetting agents, and many others. For complete data, write the district office nearest you.

DU PONT
REG. U. S. PAT. OFF.

DYES AND CHEMICALS

Better Things for Better Living
. . . through Chemistry

E. I. du Pont de Nemours & Co. (Inc.)
Organic Chemicals Department
Dyes and Chemicals Division
Wilmington 98, Delaware

SALES OFFICES:

ATLANTA 9, GA. . . . 1261 Spring St. N. W.
CHARLOTTE 1, N. C. . 427 West Fourth St.
CHICAGO 3, ILL. . . . 7 South Dearborn St.
LOS ANGELES 58, CALIF. . 2930 East 44th St.
CLIFTON, N. J. . . . . 50 Page Road
PALO ALTO, CALIF. . . . 701 Welch Road
PHILADELPHIA 3, PA. . . . 1616 Walnut St.
PORTLAND 9, ORE. . . 1238 N. W. Glisan St.
RUMFORD 16, R. I. . . . 50 North Broadway
DU PONT OF CANADA LIMITED, Montreal, Canada

itoba, and will be capable of producing 90 tons per day of liquid alum.

Brandon Sales, Inc., has named Robert S. Davis president, succeeding Kenneth E. Fryfogle who has resigned. The appointment is effective immediately. Mr. Davis will be responsible for the sale and manufacture of Brandon Dryer Felts.

Mr. Davis graduated from Clemson College in 1951 and has been affiliated with Brandon since. He was sales representative for Brandon Dryer Felts from 1954 to 1959 when he became sales manager.

Kelco Co., manufacturer of refined algin products for the paper and chemical industries has elected Robert O. Davison vice president. He has been with Kelco since 1934.

Mr. Davison will also continue as manager of the firm's Eastern Division with headquarters at 75 Terminal Avenue, Clark, N. J. Other Kelco offices are located in Chicago and Los Angeles, with extensive research facilities in San Diego.

Fawick Airflex Division, Fawick Corp. has announced appointment of Transmission Engineering Co. as northern California representative.

The company, located at 427 Bryant Street, San Francisco, will handle Fawick's complete line of industrial air and magnetic clutches, brakes and related components.

Manchester Machine Co. has announced that U.S. Machinery Co. has been appointed its export agent. U.S. Machinery will represent Manchester in the sale of paper machines and machine room components to foreign owned and operated paper mills. Manchester will, however, continue to handle all sales to foreign mills owned and operated by American and Canadian firms.

"This move is an important step in Manchester's program of continuing growth and expansion," reported Gex P. Condit, president of the Middleton, Ohio, paper mill equipment manufacturer. "Because of the outstanding performance of Manchester machines, and the fine reputation enjoyed by U.S. Machinery we anticipate earning a representative share of the overseas market. At the same time, the agreement assures American and Canadian paper manufacturers of an undisturbed direct relationship with Manchester in all sales of equipment to their foreign mills."

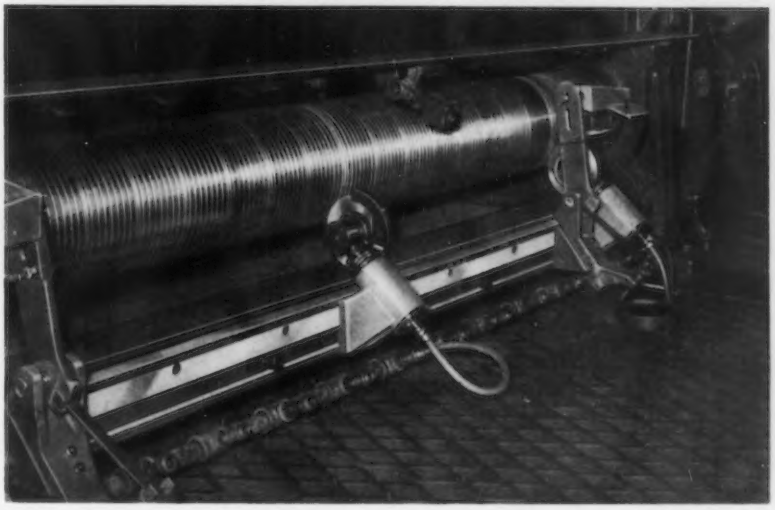
Manchester manufacturers complete paper machines and all machine room components including headboxes, fourdrinier and cylinder machines, presses and press sections, dryers, calenders, reels and winders.

U.S. Machinery maintains headquarters in New York City and sales offices throughout Europe, South and Central America and Japan.

Metal Hydrides, Inc., has announced acquisition of complete ownership of the Danvers sodium borohydride plant, formerly co-owned with the United States Navy. MHI president, Lewis W. Davis, has announced that negotiations for the transfer of ownership have just been concluded with the General Services Administration.

MHI plans immediate engineering activity to prepare the plant for limited production. Constructed three years ago to produce sodium borohydride as an intermediate in the production of high-energy fuel under a $13.5 million navy contract, the plant was closed when the Navy cancelled its high-energy fuel program in June, 1959. At cancellation, the plant had produced in excess of 1,700,000 pounds of sodium borohydride.

JAGENBERG
"MULTI-SHEAR" SLITTERS



"MULTI-SHEAR" Slitting Unit in a popular score-cut winder

- READILY INSTALLED IN MANY SCORE-CUT WINDERS
- SUITABLE FOR NEARLY ALL GRADES OF PAPER AND BOARD
- PROVEN IN HUNDREDS OF WINDERS

Many types of score-cut winders can be converted to shear cut without extensive rebuilding by installation of a JAGENBERG "MULTI-SHEAR" slitting unit. Operators appreciate the greatly reduced set-up time of JAGENBERG "MULTI-SHEAR" slitters as compared with conventional shear cut systems.

When changing a winder from score cut to shear cut we replace the platen roll with a patented air-clamp slitter shaft. This shaft carries a large number of glass-hard steel bushings each of which has eight cut grooves to serve as bottom slitters. No tools are required to position the cut where it is needed. The run of the paper web is the same as for score cut.

Manual or pneumatic top slitters for the "MULTI-SHEAR" system are mounted on existing top slitter bars.

For full details of the "MULTI-SHEAR" slitting system contact

JAGENBERG USA, INC., 300 Park Avenue South, New York 10, N. Y.

In Canada: **JAGENBERG OF CANADA LTD.**, 209 Davenport Rd., Toronto 5, Ont., Canada

CHAS. T. MAIN, INC.
ENGINEERS
PROCESS STUDIES, DESIGN, SPECIFICATIONS, CONSTRUCTION SUPERVISION
PULP AND PAPER MILLS
STEAM, HYDRAULIC AND ELECTRICAL ENGINEERING REPORTS, CONSULTATION, VALUATIONS
●
BOSTON, MASSACHUSETTS
CHARLOTTE, NORTH CAROLINA

Figures of the Week

PAPER PRODUCTION RATIO REPORT—American Paper & Pulp Assn. Figures
(Production as per cent of normal capacity)

COMPARATIVE WEEKLY SUMMARIES

	Mar. 4	Mar. 11	Mar. 18	Mar. 25	Apr. 1
1961	90.8	92.0	91.3r	91.1r	90.2
	Mar. 5	Mar. 12	Mar. 19	Mar. 26	Apr. 2
1960	97.1	97.6	98.7	99.0	97.9

r Revised.

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1960	96.5	97.7	98.1	96.9	97.6	96.1	81.2	91.7	89.1	94.8	92.0	80.2	92.7
1961	87.9	90.0‡	91.1P										

‡ Preliminary.

COMPARATIVE YEARLY SUMMARIES

	1954	1955	1956	1957	1958	1959	1960	1961
Year to Date	94.1	96.2	101.2	96.0	88.5	90.2	97.5	89.6
Year Average	91.6	96.2	97.9	90.4	87.0	92.2	92.8	

All of the above data is based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available.

PAPERBOARD OPERATING RATIOS†—National Paperboard Assn. Figures

COMPARATIVE WEEKLY SUMMARIES

	Mar. 4	Mar. 11	Mar. 18	Mar. 25	Apr. 1
1961	89	93	91	91	91
	Mar. 5	Mar. 12	Mar. 19	Mar. 26	Apr. 2
1960	94	94	94	93	91

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1960	92	95	94	93	94	92	78	94	88	93	86	73	89
1961	88	89	91										

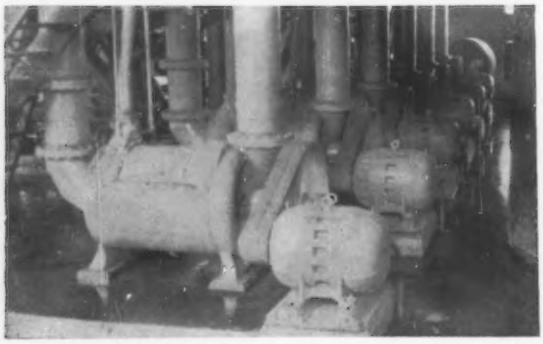
‡ Preliminary.
† *Per cents of operation based on "inch-hours" reported on a 6-day basis to the National Paperboard Association*

SUMMARY OF PAPERBOARD STATISTICS—National Paperboard Assn. Figures

ITEM	WEEK ENDING March 25, 1961	WEEK ENDING April 1, 1961	CUMULATIVE TO DATE Jan. 1, 1961, to April 1, 1961
% Activity	91%	91%	90%
Total	313,642	320,592	3,919,227
Containerboard—Domestic Use	158,349	162,607	1,980,677
Liner	102,673	107,866	1,313,196
Corrugating Material	50,400	48,547	604,654
Chip & Filler Board	5,276	6,194	62,827
Boxboard—Domestic Use	97,737	99,229	1,234,164
Folding	60,866	55,162	729,312
Set-Up	9,292	11,103	121,312
Special Food Board	27,579	32,964	383,540
Other Paperboard	57,556	58,756	704,386
Containerboard Type	26,911	26,506	333,437
Boxboard Type	30,645	32,250	370,949
Total Orders			
Received	304,866	335,296	
Unfilled End of Week	426,654	440,723	

We Design, Erect and Maintain All Types of Tile Structures and Corrosion-Resistant Linings

STEBBINS
ENGINEERING AND MANUFACTURING CO.
WATERTOWN, N. Y.
Pensacola, Seattle,
Montreal, Vancouver



SAVE WITH APMEWS

- Replace flat screens with APMEW centrifugal swirling fibre cleaner screens, 20 to 1
- Occupy 90% less space
- Use less H.P.
- Produce cleaner, stronger, more salable paper

CONTACT
APMEW, Inc., P. O. Box 1, Glens Falls, N. Y.

PAPER TRADE JOURNAL is always mailed on Friday at East Stroudsburg, Pa. If you feel that there is undue delay in receiving your copies we suggest that you write to your local postmaster with a copy to S. E. Marsh, assistant postmaster at East Stroudsburg. If you will also send a copy of your complaint to us this will keep us posted on areas of poor service.

Oakite HURRICLEAN® Gun

New steam-detergent gun packs a cleaning wallop

—yet it weighs in at only 6¼ lbs.

Here is a steam-detergent gun any child could handle – it's that light, that safe – but see what it does! Hitch it to your steam supply, aim it at your toughest cleaning job. Watch it slam into heavy pitch, scale, slime. It's almost like ''wishing'' the dirt away.

Steam-gunning with a hot detergent solution isn't new. What's new is a steam gun that's not heavy, not cumbersome, not dangerously hot.

Light ... Here is a gun that weighs only six and a quarter pounds, yet packs a heavyweight cleaning punch.

Safe ... Here is a gun that's always cool to the touch. The outer tube carries the cool detergent solution.

Easy ... Here is a gun that rotates spray with a twist of the grip. No annoying hose kink, no tiring bending. You don't even change stance.

Find out how the "Hurriclean" gun can save your mill money by blasting pulp, slime and soil from hard-to-reach corners of tanks and equipment ... and how it saves time on special jobs like paint stripping. Call your Oakite Technical Service Representative or write for booklet. Oakite Products, Inc., 48A Rector St., New York 6, N.Y.

In our 52nd year.

OAKITE

Export Division Cable Address: Oakite

Technical Service Representatives in Principal Cities of U. S. and Canada

These famous shafts mean easier roll handling, faster, at lower cost!

Tidland PNEUMATIC SHAFTS

for all roll winding, and unwind equipment

Light, strong, easy-to-use for fast set-ups. Positive uniform, non-slip grip. No damage to cores or material. Collapsible, instant release! A complete line, custom-fitted to any need, any length, any diameter, for any size rolls.

LEAF-TYPE
LUG-TYPE AND
SPECIAL SHAFTS
FOR:
PAPER,
PAPERBOARD,
PLASTIC FILMS,
METALS, FOILS,
LAMINATES,
TEXTILES,
RUBBER

Sold exclusively by

CAMERON

Write for literature

CAMERON MACHINE COMPANY
Franklin Road, Dover, N. J.

Canada: Cameron Machine Co. of Canada, Ltd.
14 Strachan Ave., Toronto, Ontario

France: Cameron Europe S/A
5 Rue de Prony, Paris (17e) France

Brazil: Cameron Maquinas Ltda.
Rua 24 de Maio, 104-5°, Sao Paulo

AA-366

AHCO SUGGESTS

Consider the AHCO range of paper coating additives, designed to meet your most exacting requirements.

For Enhancing Surface Quality

Ahco Finish CS – A metal stearate possessing exceptionally fine particle size. Improves printing surface, reduces dusting. Improves gloss, will not darken on calendering. Better wet pick resistance. Available as a pourable liquid or as a readily dispersible powder. FDA extended.

For Improving Color Flow

AHCOL 375 – A sulfated tall oil designed to improve the flow properties of the coating color and to increase lubricity at the calender stack. Better pigment binding reduces dusting. FDA extended.

For Promoting Level Dyeing

Eveners #1 and #32 – Water soluble light oils that promote level dyeing and bring out the brightness of the color. They prevent foam build-up in the coating mix, resulting in a finish free from "fish-eyes". FDA extended.

For Imparting Lubricity

BUTYL STEARATE – A superior lubricant, particularly suitable for high solids coatings. FDA approved.

AHCO's Technical Service Laboratories stand ready to assist you with your specific paper coating problems. Consult your AHCO representative.

Quality AHCO PRODUCTS Integrity

Call, Write or Wire

ARNOLD, HOFFMAN & CO. INCORPORATED

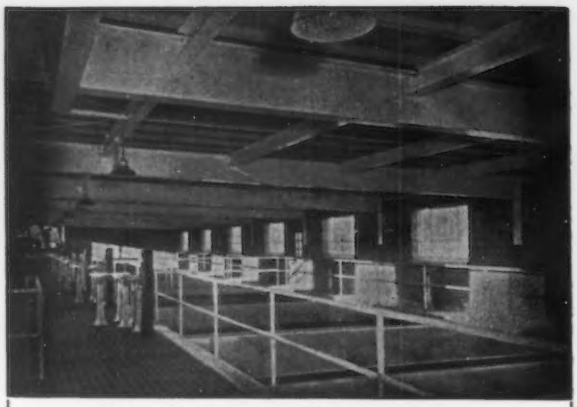
55 Canal Street, Providence, Rhode Island • Est. 1815

A Subsidiary of Imperial Chemical Industries Limited, England

West Coast Representative: Chemical Manufacturing Company, Incorporated of California

ICI

459-1



Concrete Gravity Air-Water-Wash type water Filtration Plant producing, at low cost, water with turbidity 0, color under 5 and iron 0.05 p.p.m. Fe.

OTHER PRODUCTS

Demineralizing Plants
Water Softening Plants
Pressure Filter Plants

and

All other types of water treating systems, including strainer valves, air wash systems, filter sand and anthracite beds and all filter repair and replacement parts. Over 50 years experience building new and modernizing old water treatment plants.

Write for FREE Bulletins

H&T SERVICE

HUNGERFORD & TERRY, INC.

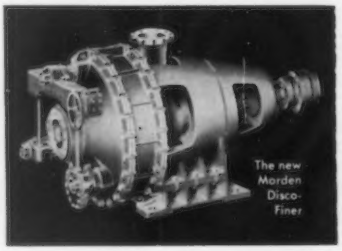
CLAYTON 4, NEW JERSEY

The **DRAPER** *Felt*

DRAPER BROTHERS COMPANY

CANTON, MASS.

BRILLIANT NEW REFINING CONCEPT



The new Morden Disco-Finer

MORDEN
MACHINES COMPANY
3420 S. W. MACADAM AVE.
PORTLAND 1, OREGON

Engineering break-through provides, in one machine, amazing precision, tremendous production capacity, versatility that defibers or refines.

Send for all the facts!

STEINEN

INDUSTRIAL SPRAY NOZZLES

NEW FREE CATALOG . . .

32 illustrated pages of engineering data, including nozzle spray characteristics, capacities, applications and simplified nozzle selection tables.

MORE NEW INFORMATION . . .

BULLETINS: Square spray and solid jet patterns.

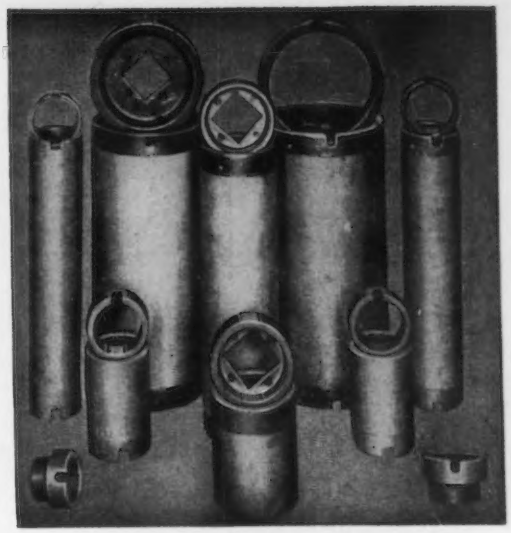
DATA SHEETS: Leak-proof adjustable joint, phosphatizing nozzle and roof cooling.

COMPARISON CHARTS: Shows nozzle interchangeability.

Write today . . . take advantage of Steinen's complete engineering service.

STEINEN

WM. STEINEN MFG. CO.
INDUSTRIAL NOZZLE DIVISION
35-45 Bruen Street Newark, New Jersey



ELIXMAN
CORES CAPS

Straight wound paper cores made in sizes from 2" to 10" inside diameter with any thickness wall required.

Long draw protected slot caps of heavy gauge steel in all standard sizes.

Heavy duty caps with reenforced square hole. This patented feature of reenforcement gives added strength and durability.

Samples of caps or cores will be gladly submitted

ELIXMAN PAPER CORE COMPANY, INC.
CORINTH, N. Y.

5 WAYS STONE & WEBSTER SERVES THE PAPER INDUSTRY

PRELIMINARY RECOMMEN-DATIONS

ECONOMIC EVALUATIONS

ENGINEERING DESIGNS

PROCURE-MENT OF MATERIALS

CONSTRUCTION

STONE & WEBSTER ENGINEERING CORPORATION
A Subsidiary of Stone & Webster, Inc.
New York, 90 Broad Street Boston, 49 Federal Street
Chicago Houston San Francisco Los Angeles Seattle Toronto Calgary

AMERICAN AND ENGLISH CLAYS

FOR ALL PAPER MAKING PURPOSES

ANGLO-AMERICAN CLAYS CORP.

(Formerly: English China Clays Sales Corporation)

6 East 45th Street, New York 17, N. Y.

how much do you miss without this?

Spray Nozzles

COMPLETELY DESCRIBED AND ILLUSTRATED IN CATALOG 24—**WRITE FOR YOUR COPY**

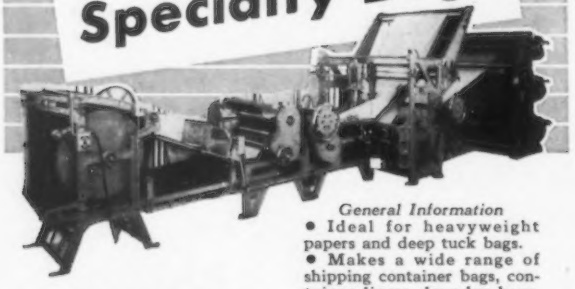
The most comprehensive spray nozzle catalog ever printed. Thousands of designs and sizes . . . unequalled choice of capacities, characteristics and materials. The result of over twenty-five years of specialized research, design and manufacturing.

SPRAYING SYSTEMS CO.

3220 RANDOLPH STREET • BELLWOOD, ILLINOIS

ADVANCED DESIGN • GREATER PRODUCT CHOICE • PROMPT SERVICE

New! LARGE Industrial Specialty Bags



POTDEVIN
LARGE FLAT AND SQUARE BAG MACHINE

General Information

- Ideal for heavyweight papers and deep tuck bags.
- Makes a wide range of shipping container bags, container liners, laundry bags, waxed garbage bags, etc.
- Can be equipped with pneumatic feed rollers, mill roll lifter.
- Farval lubrication and seam paste extruder.
- Range—6¼" x 15" up to 23" x 37½".
- Direct-connection for flexographic web press.

Write for samples and complete details.

ESTABLISHED IN 1893 POTDEVIN

POTDEVIN MACHINE CO.

223 North Street Teterboro, N. J.

Designers and manufacturers of equipment for Bag Making, Printing, Coating, Laminating, Gluing and Labeling.

Another Plant To Serve You

SHIP US IN KALAMAZOO

PACKING PLANTS
CHICAGO, ILL.
WASHINGTON, D. C.
CAMDEN, N. J.
KALAMAZOO, MICH.
LOUISVILLE, KY.

THOMAS PAPER STOCK CO.

1500 N. Hooker St. MO-4-5700 Chicago 22, Ill.

PAPER TRADE JOURNAL CLEARING HOUSE

Help Wanted

PAPER MEN

$5,000 to $50,000

SALES • PRODUCTION • TECHNICAL

Finding and landing THE ONE BEST JOB requires sound analysis, careful planning, proper contacts and skillful negotiation.

Paper men ourselves, and the only recognized professional specialists in the world in our particular field, we assist responsible paper men to accelerate their careers by uncovering and developing THE SPECIFIC SITUATION that most exactly fits the needs of each individual we serve.

If you seek to better yourself, and your performance to date entitles you to our endorsement, we can and will help you. Contact us in absolute confidence for information regarding procedure.

GEO. M. SUNDAY & ASSO.

PERSONNEL CONSULTANTS TO THE PULP, PAPER & ALLIED INDUSTRIES

6 East Monroe, Chicago ANdover 3-1970

TF

Help Wanted

RESPONSIBLE TECHNICAL POSITION

Excellent opportunity for chemical engineer, chemist, or paper school graduate with experience in the manufacture and coating of boxboard. Position as Technical Director or Assistant Superintendent. Modern mill with many company benefits.

THE INTERSTATE FOLDING BOX COMPANY

Middletown, Ohio

A-17

PRODUCTION MANAGER

Growing Phila. converter needs experienced man to take full charge. Exc. career opt. Send full details. Box 61-68 care Paper Trade Journal.

A-24

TECHNICAL SPECIALIST

BLEACHING

We are looking for a man to work with our pulp and paper sales division to give technical assistance in the marketing and sale of bleaching systems and equipment. We would also expect that this man could provide guidance in the design and field development of these systems and equipment in addition to keeping abreast of developments and competition in the bleaching field.

We require either a chemical engineer or a pulp and paper school graduate with at least five years experience in bleaching processes. The successful applicant will be based at our Stamford headquarters and must be willing to travel.

This position pays an excellent salary plus bonus to the individual who meets our specifications.

Please send complete resume including salary requirement to:

C. R. Farrell

DORR-OLIVER INC.

HAVEMEYER LANE STAMFORD, CONN.

A-17

GIBBS-BROWER CO., INC.

10 Depot Plaza, White Plains, New York

Established 1898

Telephone—Rockwell 1-1130

BRANCHES: **400 Wash. Building, Madison 3, Wisconsin**

Acepsa
Albeniz #4418, Mexico 15, D.F. — **5270 E. Wash. Blvd., Los Angeles 22, Calif.**

PRINTING PRESSES

1—24" 5-color Kidder Calloprinter
1—24" 4-color Kohlbach Flexo Press with Stanford Web Guide and Tension Controls
1—26" 3-color gravure press
1—30" 6-color Kidder calloprinter
1—32" 4-color Potdevin flexo tailprinter
1—33" 6-color Modern Clipper Flexo Press
1—33" 4-color Wolverine Hydro-Printer
1—34" 4 Color Wolverine—Poly Press
1—36" 6-color Cottrell Heinrich Flexo Press
1—37" 2 color flexo t/printer
1—40" 4-color W & H Flexo Press
1—41⅜" 5-color Staude Roto Gravure Press
1—42" 4-color Crawford Flexo Press
1—42" 4-color Hudson Sharp Flexo Press
1—48" 6-color Heinrich 4 Flexo 2 Gravure
1—50" 3-color Custom made flexo press
1—51" 3-color Flexo Press
1—60" 4-Color Gravure Press

CAMACHINES

1—162" Type 10 Model 19 Shear Cut
1—102" #18
1—82" Type 12
1—72" Type 10 6A Anti Friction Bearings
1—72" 10-10A
1—62" 10-11A
1—62"—50"—42" type 6
1—52", 10 5-A
1—62"—42"—32" 26-3A Duplex
1—52" 24-7 Duplex
1—50" 28-3D Duplex

OTHER SLITTERS

1—102" Langston, 60" Rewind Capacity
1—82" & 1—92" "8A" Langstons
1—40" & 1—52" Fales Model "B"
1—52" Meisel (Shear Cut)
1—50" & 2—40" Beck Razor Blade slitters
1—40" & 1—60" Kidder SH 40" rewind
1—24" 1—30", 1—36" & 1—40" Kidder S.L. & 1—36" SLN

POWER PAPER CUTTERS

SEYBOLDS:	64" precision	
	56"-Dayton	44"-Dexter
	50"-Precision	44"-C&P
		44"-Oswego
	44"-Mod. "CF"	44"-10Z
75"-Oswego	40"-Mod. "CF"	38"-Oswego
	50"-C&P	32"-Oswego
57"-Oswego	50"-Dexter	32"-3Y

MISCELLANEOUS MACHINES

2—PO2 Roto Bag Machines
1—45" CCSH Beck Sheeter ready for E/eye
1—36" CCSH Beck Sheeter with E/eye
1—90" M&W Sheeter O/lapping del. & Layboy
5—Hamblets 100-72-64-60" w/layboy
1—84" Hamblet Duplex Heavy Board Sheeter
1—78" M&W Sheeter & Layboy
1—Hansel Bag Machine—3 color printer
1—Simplex 7-24 Pouch Machine, E/eye
1—Multipath Bag Machine — 4 Color Holweg Printer
1—Strachan & Henshaw Bag Machine—2-color Aniline Printer
1—Model 4 Potdevin Sack Machine
2—38" x 24" 4-Post Seybold Die Presses
3—Sheridans 50 x 24 44 x 20 36 x 18
Embossers 48" 55" Waldron & 50" Heavy Duty Hudson Sharp Tinter-Embosser
1—34" Waxer with 4-Ton Refrig. Unit
1—40" International Paper Box Machine Co's Sheet-Fed Carton Waxer
1—60" Perkins Squeeze roll waxer
1—Johnstone Knife Grinder

A-17

Help Wanted

Opportunities at FMC's

Newly Enlarged

CHEMICAL RESEARCH & DEVELOPMENT CENTER

Princeton, New Jersey

PULP & PAPER APPLICATIONS RESEARCH

Chemists or ChE's with 2 to 6 years experience in paper technology. To work on technical service problems in pulping and bleaching.

These responsible positions in our Inorganic Research & Development Department offer excellent opportunities for growth. Arrange for an interview by submitting a resume, including salary requirements, to Mr. W. J. Paquette.

fmc
FOOD MACHINERY AND CHEMICAL CORPORATION

FOOD MACHINERY & CHEMICAL CORPORATION

P. O. Box #8, Princeton, N. J.

A-17

PAPERBOARD DEVELOPMENT

Major division of multi-plant paperboard and carton manufacturer is searching for a competent young man to assume an important role in our division research and development lab. The work will involve quality control, development and application of standards, development of new products and new applications of old products, report writing, and customer complaints and inquiries on all grades of paperboard and test liner. Qualified applicant will have a major in chemistry or allied field and a minimum of two years experience in some or all of the above work in the paper industry or have a major with no experience required in pulp and paper from an accredited school. We are prepared to pay the going rate—plus—for a well qualified applicant. Western Illinois location, City of 40,000. Our employees know of this advertisement. Reply in confidence giving complete details of education, experience, and personal data in first letter or resume including salary requirements to R. Effler, P.O. Box 1033, Hutchinson, Kansas.

A-24

EXPERIENCED SALESMAN

—or sales-minded individual presently employed in the paper industry—required for manufacturer of chemical specialty products used in pulp and paper making.
Territory will include New York State and Western Massachusetts.
Submit outline of educational and vocational backgrounds.
Our employees are aware of this advertisement.
Reply Box 61-79 care Paper Trade Journal. A-17

ASSISTANT SUPERINTENDENT FOR TISSUE PAPER MACHINE

We want an aggressive man who will assist his superintendent in improving the general efficiency and reliability of his entire department also sharing in the responsibility with his superintendent for a new, modern, large, high-speed tissue machine currently recognized for quality production. This is a challenging opportunity in an aggressive, fast-growing organization for a person with an engineering or technical background with supervisory experience in tissue paper manufacturing. Southern location. Salary commensurate with experience and ability. Send complete resume to Box 61-58 care Paper Trade Journal. A-17

PAPER MACHINE SUPERINTENDENT

Excellent opportunity for qualified applicant with practical paper making experience in Fine Papers—Bond, Ledger, Offset, Mimeo, etc. High speed machines. Must have strong organizational and leadership ability. Salary open.

Mill located about ten miles from Center Philadelphia in Montgomery County, Pennsylvania, in an area with wide choice of desirable living conditions.

Send resume including educational and past work history to:

Mr. Paul R. Dugan,
Personnel Director
Hamilton Paper Company
Miquon, Pennsylvania

M-8

Help Wanted

Personnel Service Associates
483 Beech Street, Holyoke, Mass.
Tel. JE 2-1912
H. M. Grasselt, Mgr.

Personalized Placements with Pulp, Paper and related Industries. Administrative, Techn., Sales, General A-17

MECHANICAL ENGINEER FOR PAPER MACHINE DEVELOPMENT PROGRAM

We need a man with at least 4-6 years of design and operating experience in news kraft or publication running over 1600 f.p.m. Pilot plant developments have reached the full scale field trial level and operating and installation experience is needed. Opportunities also exist for additional design and development work. Eastern location, top facilities. Salary open. Please send a detailed resume to Box #61-75 care Paper Trade Journal. A-24

TOUR BOSS—One machine—Southern Folding Boxboard Mill. Outline full qualifications and background. Address Box 61-78 care Paper Trade Journal. A-17

WANTED—Boss Machine Tender for Pacific Coast Mill making newsprint and specialties. Address Box 61-80 care Paper Trade Journal. M-8

Situations Wanted

***Production executive* — conversion of boards, paper & film. Well versed in heading up all production functions in an organization; or reorganization deal. Multiple manufacturing units. Employed — wishes change for challenging opportunity. Box No. 61-9 care Paper Trade Journal.** A-24

"BOARD MILL MANAGER, 37, currently employed, ambitious, aggressive, tremendously successful in the application of basic cost reduction techniques. 12 years experience as Technical Director, Superintendent, Divisional Manager, following 5 years of Product Research and Devel. Will consider top-flight opportunity only." Address Box 61-67 care Paper Trade Journal. A-24

General or Paper Mill Superintendent

40 years' experience, 35 in supervision, 25 as mill supt. on printing bond, board, and converting, also printing press operations. Retired early but wish to work another five years either operating, training, or consulting; foreign or domestic. Available at once short or long periods. Write Box 61-76 care Paper Trade Journal. M-8

GRADUATE INSTRUMENT ENGINEER with ten years sales, application and startup experience, desires position, central engineering department, pulp and paper industry. Prefer Eastern U. S. Address Box 61-70 care Paper Trade Journal. A-17

Keep your eye on our Classified Advertising Section

ROSS PAPER MACHINERY CO.

265 PASSAIC STREET • NEWARK 4, NEW JERSEY

STANLEY S. ROSS, President — HUMBOLDT 4-8880

SUPPLIERS OF PAPER MACHINERY TO THE WORLD — RPM

QUALITY GUARANTEED MACHINERY FOR SALE OR LEASE

BAG MACHINERY
1—S&H 3¼" to 10¼" face, 6" to 13" Tube Pull
1—G&H 3 ply Tuber—SOM—Flat or Gusseted Bags; tube length 9" to 35"

BEATERS
2—3000# Downingtown 60" x 67" roll; like new
1—1500# Dilts Breaker Beater; roll 54" x 64" w/75 h.p. motor

CALENDER STACKS
1— 80" P & J 7 roll; heavy duty
2— 82" & 86" Lobdell five roll
1— 96" B-C 6 Roll—heavy duty
1—104" B-C 8 roll
1—115" B-C 7 roll
1—124" Downingtown 5 roll
1—124" Downingtown 6 roll
1—126" Farrell 8 roll—w.c. bearings

CHIPPERS
1— 96" Murray 6 knife; A-F Brng

COATERS
1— 24" Waldron Coater & Embosser
1— 60" Egan Air Knife—New 1956
2— 65" & 76" Mayers

COMPLETE PAPER & BOARD MACHINES
3—Sandy Hill 81" trim single cyl. Tissue
1—M & W 72" Trim Fourdrinier paper machine
1—B-C 100" 7 cyl. Board Machine Complete
1—M & W 72" Trim Yankee Fourdrinier
1—Rice Barton 84" Fourdrinier

CYLINDER MOLDS
1—104" face x 36" dia
8—114" face x 36" dia. w/rubber couches
8—124" face x 36" dia w/rubber couches

CYLINDER WET ENDS
1—Single cylinder; 99" face x 48" dia.
1—114" 7 cyl. Wet End, complete through main presses
1—124" 7 cyl. Wet End, complete through main presses

DRYERS—HYDROSTATICALLY TESTED
24" Dia.:
37—46" face; Chrome plated
1—156" face w/gear and steam joint

28" Dia.:
3— 70" face w/gears & bearings
3— 73" face w/gears & bearings
6— 76" face w/gears & bearings
4—84" face w/accessories

36" Dia.:
1— 42" face
2— 44" face; 2—46" face
3— 70" face w/gears & bearings
11— 72" face w/gears & bearings
1— 74" face Lukenweld w/A-F Brng
8— 75" face w/gears & bearings
26— 76" face; complete section
9— 76" face w/gears & bearings
2— 77" face w/gears & bearings
1— 78" face w/gears & bearings
2— 80" face
5— 84" face
11— 84" face; complete section
7— 94" face; complete section
1— 96" face
1—138" face
10—160" face

42" Dia.:
23— 73; 74; 76" face; complete section
46— 96" face w/gears, frames & bearings
1—120" face
1—160" face

48" Dia.:
49— 46" face; chrome plated
12— 82" face; complete section
3— 84" face
7— 94" face
1— 96" face
12— 98" face—complete section
19—106" face w/gears & bearings
2—110" face w/gears & bearings
10—123" face w/gears, frames & bearings
1—128" face

DRIVES—ENCLOSED RIGHT ANGLE
1—Beloit 65 h.p. Ratio 2.88 to 1
3—Jones 65 h.p. Ratio 4.83 to 1
1—Michigan 92½ h.p. ratio 10.1 to 1
1—Phila. 28 h.p. Ratio 10.56 to 1
1—50 h.p. Reliance VS with MG set & controls
1—Cleveland 47 h.p.—ratio 3 5/9 to 1
1—Cleveland 23.5 h.p.—ratio 3 5/9 to 1
2—Falk 50 h.p. Ratio 3.529-1
3—Beloit 75 h.p. Ratio 3, 4 & 4.6875 to 1

EMBOSSERS
1— 80" Hudson Sharp; A-F Brng
2— 62" Textile Machinery Co., w/drives

EXTRACTORS ROLLS—DOWNINGTOWN
1—128" face x 24" dia.—complete section

FELT CONDITIONERS—VICKERY
1—New Bird—218" Max. cleaning area
1—New Bird—166" Max. cleaning area

FLAT SCREENS
2— 12 plate IMPCO w/Dunbar Drives
8— 14 plate IMPCO—Bronze Vats S.S. Plates

"HYDRAPULPER"
1—Dilts 16 ft. Batch type complete w/125 h.p. motor—CI Sectional Tub

INLETS & HEADBOXES
1—106" Valley w/8" distributing roll
1—131" Valley w/10" distributing roll; SS lined

JORDANS
2—Appleton #1 w/A-F Brng
1—Horne w/A-F Brngs
4—Shartle Miami #2 w/A-F Brngs
1—Jones Midget—Used 2 months
1—E. D. Jones #4 Imperial A.F. Brng.

MOTORS 3 PH 60 CYCLE
1—100 h.p. GE; 440 v; 695 r.p.m.
1—300 h.p. West; 2200 v; 503 r.p.m.
1—350 h.p. GE; 2200 v; 720 r.p.m.: Synch

PAPER MACHINE DRIVES
1—De Laval 100 h.p. steam turbine w/reducers

PULP MILL EQUIPMENT
1—Lannoye #1 Pulper
1—Murray 2 deck Chip Screen, 5 ft x 14 ft.

PUMPS—OPEN IMPELLER
47—Centrifugal Stock and Water Pumps
1—Shartle 8 x 18 Duplex

REELS
1—100" Kohler automatic two arm unwind reel; 60" dia rolls; new condition
1—109" two bowl upright
1—123" Beloit—2 bowl
1—126" Beloit Aldrich surface drive type
1—146" B & S pope type w/Reliance drive

REFINERS
1—Jones Fibremaster — SS Filling—200 h.p. motor & controls
2—#1 Claffin; A-F Brng
1—24" Downingtown Weiner; new
2—36" Bauer, Model 185 w/2—75 h.p. motors
3—36" Bauer Model 185 with 2 100 h.p. motors
1—Dilts #4 Hydrafiner—AF Brng.
1—Dilts 36" Classifiners AF Brng
2—#4 Shartle Cyclifiner A.F. Brng.

ROLL GRINDERS
1—124" x 30" Farrel w/crowning device
1—208" x 32" Farrel w/crowning device

ROLLS
Distributor—Stainless Steel
2— 8" dia x 115" face
1— 6½" dia x 115" face
Couch—Rubber Covered
20 Misc. Sizes Dwngs Available
Press—Rubber or Brass Covered
71 Miscellaneous sizes. Drawings available
Felt—Steel, Brass, Rubber Covered
335 Miscellaneous sizes, Drawings available
Calender—Chilled Iron
72 Miscellaneous sizes. Drawings available

ROTARY SCREENS
5—Bird #3A, Model 100 w/copper vats
1—Jones Leithwalk copper lined

SHEETERS—WITH BACKSTANDS
1— 45" Beck w/Jogger
1—45" Hamblet w/M&W Layboy
6— 56", 60", 66" & 70" Hamblets
1— 65" Kidder w/elec. eye and layboy
3—72" Hamblet w/M&W Layboy
1— 76" Beloit Duplex
1— 82" Hamblet
2—82" Hamblet w/overlapping M&W Layboy
1— 85" Hamblet duplex w/layboy
1—105" Hamblet
1—112" Beloit Duplex Board Cutter; A-F Brng

SLITTERS & REWINDERS
17¾" Maximum Rewind Diameter
2— 42" Cameron Type 26-2A
24" Maximum Rewind Diameter
2— 42" Cameron Type 6
1— 42" Cameron Type 6 Shear Cut
1— 62" Cameron Type 6
1— 72" Cameron Type 9-5
30" Maximum Rewind Diameter
1— 60" Langston Shear Cut
1— 72" Cameron Type 10; A-F Brng
1— 72" Cameron Type 10 Shear Cut; A-F
36" Maximum Rewind Diameter
1— 70" Variable Speed Center Winder
1— 62" Cameron 8-10
1— 72" Cameron Model 8-10
1— 82" Cameron 10-11; A-F Brng
42" Maximum Rewind Diameter
1— 40" Egan Shear Cut; A-F Brng
1— 60" Kidder Model SH Low Bed
1— 72" Beloit Shear Cut
1—136" Cameron Type 18; A-F Brng
1—161" Cameron Type 18 w/60 h.p. Reliance VS Drive
48" Maximum Rewind Diameter
1— 86" M & W Four Drum Shear Cut
1—152" Langston Shear Cut
60" Maximum Rewind Diameter
1—112" Cameron Type 18
1—120" M & W two drum w/75 h.p. drive
1—120" Langston
1—136" Langston; AF Brng; shear cut

SLITTERS & REWINDERS—DOUBLE REWIND
18" Maximum Rewind Diameter
1—42" Cameron 26-7D for Cellophane
30" Maximum Rewind Diameter
1—42" Essex Shear Cut; A-F Brng

STOCK CLEANERS
2—1000 g.p.m. Shartle Hydrafuges w/motors
14—Bird Dirtecs; 2" & 6" bronze
1—Bird Dirtec 12". Rebuilt by Bird
21—4" Vortraps—Bronze

STOCK REGULATORS
2—Braemer SS; 25 t/d cap; Foxboro controls
2—Poirier; 25T/D cap

SUCTION COUCH ROLLS
1—125" face x 18" dia—bronze brng
1—144" face x 30" dia—roller brng

SUCTION EXTRACTOR ROLLS—DOWNINGTOWN
1—105" face x 19" dia
1—126" face x 22" dia; complete section
1—134" face x 18" dia.; A-F Brng

SUCTION PRESS SECTIONS
1—114" face x 20¼" dia. R. C. Complete section
1—120" face x 18" dia—R.C.—Roller brng
1—126" face x 24" dia. R.C.; A-F Brngs; new 1951

SUPERCALENDERS
2—30" Norwood 4 roll
1—53" Norwood, 13 roll, glassine; A-F Brngs
2—63" Norwood 8 roll; A-F Brng
1—92" Norwood 7 roll w/drive

TOWEL & NAPKIN FOLDERS
1—Hudson Sharp 50", single fold—towel
2—Paper Converting ¼ fold—napkin
1—Paper Converting single fold—towel

THICKENERS
1—Shartle—Cylinder 131" x 36"—16" R.C. Couches
1—Shartle—Cylinder 36" dia. x 72" face

TRIMMERS—POWER BACK GAUGES
1—50" Seybold Twentieth Century
1—57" Seybold Precision
1—65" Seybold Dayton
3—84" Seybold Daytons

UNWIND STANDS—CONSTANT TENSION
1—34" Cameron Type CT—Electric Eye
1—72" Cameron—water cooled brake
1—82" Cameron—water cooled brake

VACUUM PUMPS
8—H-4, ½H-5, & H-5 Nash
2—L-5 & L-7 Nash
5—#2, #4, & #7 Nash Hytors
1—8 x 10 Connersville
2—MD-2 Nash w/motors; new laboratory models

WET MACHINE
1—74" face x 48" dia. mold—complete machine

YANKEE DRYERS
1—132" face x 10' dia Beloit; 35 psi

Help Wanted

ARE YOUR MAINTENANCE AND PRODUCTION LABOR COSTS OUT OF LINE WITH COMPETITIVE EQUIPMENT? TOO HIGH? IF SO, WRITE BOX 61-81 care Paper Trade Journal. A-17

TECHNICAL GRADUATE—10 yrs. Research & Technical Service, Machine Coating, Conversion Coating, Plain Paper & Graphic Arts Experience. Age 36. Desires change with Production opportunity. Presently employed. Address Box 61-77 care Paper Trade Journal. M-1

Wanted

WANTED—42" to 52" Kidder or Cameron Sheer cut slitter. Newark Paraffine Paper Co., 70 Blanchard St., Newark, N. J. A-17

WANTED—Sheet Paster for laminating Paper Board in sheet form. Address Box 61-72 care Paper Trade Journal. A-24

Sales Representation

Manufacturers representative

contacting paper mills in Pennsylvania, New Jersey, Maryland and Delaware desires additional line. Write Box 61-73 care Paper Trade Journal.

M-1

For Sale

FOR SALE
LOW PRICES

2—86" B. & S. Wet Machines; Bronze and Rubber Press Rolls; A.F. Bearings on Couches and Cylinder Molds. Complete with Gear Drives. Excellent Condition.

RUDERMAN MACHINERY EXCHANGE
Gouverneur, New York
Phone 333-334

TF

For Sale

FOR SALE

Carthage wood splitter 38" x 5' with Miller H-61 cylinder with 66" stroke, as main cylinder, and Model H-G elevating position. Equipment new, never used.

Barking drum, (Canadian Ingersoll Rand) purchased new 1959, never used, 12' x 60' Weldrum trunnion type.

Fibre processing barking drum 12' diameter x 45' long, new, never used. Barking drum available with exception of 8—53' lengths of carrying chain.

96" Murray 10 knife chipper, new 1950, with new spare disc, never used.

2—Tyler 5' x 12' vibrating screens.
1—Four knife 47" Carthage chipper.
14—Impco fourteen plate bronze screens.
16—Impco twelve plate bronze screens.
1—Sandy Hill ten plate screen, roller shoe.
1—Allis Chalmers vibrating screen, 5' x 14'.
1—Number Two Clafiin refiner with 200 HP motor.
1—Jones Fibremaster, with 200 HP motor.

Frank H. Davis Co., Inc.,
P.O. Box 231, Cambridge 39, Mass.
Telephone TRowbridge 6-0365-6-7

A-24

PULP MILL FOR SALE
New York State
Attractive financing
technical assistance
Gibbs-Brower Co., Inc.
10 Depot Plaza
White Plains, N. Y.
RO 1-1130

A-17

FOR SALE

1—Allis-Chalmers ACAP Stock Pump 16G-6 Variable pumping rate with remote control motor. 60 HP 440/3/60, 1160 RPM. 3000 g.p.m. at 50 feet head. Pump motor and base in as new condition. Original cost $4,805.00. Best Offer Address Box 61-74 care Paper Trade Journal. A-24

Keep your eye on our Classified Advertising Section

To parents of children from 3 to 15

WHICH DISEASE do you think is the single greatest killer of children under 15? Shockingly and tragically, the answer is—*cancer.*

But there is hope. The American Cancer Society is supporting 1300 research scientists in hospitals, institutions and laboratories, working to find the cause of cancer—and ways of preventing it.

Your gift to the American Cancer Society can help speed the conquest of cancer. Can help guard your children.

Fight cancer with a checkup—and a check to the **American Cancer Society.**

WHEN REPLYING to advertisements containing box numbers, please mention that box number in your address. The figures in the lower right hand corner of advertisements are NOT box numbers,—they signify the expiration date of that particular insertion.

FOR SALE

Section of 32 Rice Barton dryers 60" diameter x 157½" with double deck frames, gears, bearings, top and bottom felt equipment, four 48" felt dryers. Dryer section last operated at speed of 860 FPM. Insured for 35 lbs. steam pressure.

To go with this dryer section we can furnish either a Fourdrinier or Cylinder Wet End, also equipment which could be used to make up a paper machine.

Frank H. Davis Company, Inc., P.O. Box 231, Cambridge 39, Mass.

M-1

FOR SALE

2 Cylinder Approximately 90" Trim Paper Machine

Vats: 48"x102" mould with rubber couch. 60"x102" mould, 18" diameter rubber couch a.f.

Fans: 4 Claridge size 11 fans, motor driven.

Suction Drum Roll: 18"x102" Millspaugh with L 8 Nash pump.

Suction Primary Press: 22" Downingtown driven primary suction press roll 105" drill face. Top roll rubber covered, r.c. 19¾", a.f. bearings.

First Press: Top roll 19⅝" R.C. Bottom roll 19⅝" with felt equipment.

Second Press: Reverse suction press. Bottom roll 24"x105" Beloit R.C. with L 6 Nash pump. Top Roll 22", brass, a.f. Also equipment as last used.

Dryer Section: 16 - 42" diameter x 102" B. & C. d.d. frame, bottom felt, new 1941. 45 Beloit dryers 42" x96" d.d. frame, gears, bearings, bottom felt.

Calenders: Two 7 roll Beloit box frame calenders.

Reel: Three spool Beloit revolving type.

Winder: Langston 108" CA. New 1942. Rewinds 60" roll.

Drives: 8 Shartle spiral drive units. New 1941 with multiple disc clutch and cone pulley. Lineshaft belted to 225 HP Terry steam turbine.

Screens: 2 Jonsson screens with motors.

Beaters: 7 Dayton 1500 lb. 48"x48" beaters with washers, c.i. tubs. 2—65"x60" Dayton high speed tub beaters, c.i. tubs. Bandless type.

Stock Pumps: 10x20 Beloit duplex motor driven. 10x20 Beloit triple motor driven. 7x16 Shartles, single plungers.

Digesters: 14 Globe rotary digesters.

Vacuum Pumps: Two L 6 Nash. One L 8 Nash.

Scales: Toledo Print-O-Weight Scale, Model 64. 30 ton truck sale. Fairbanks Morse 5000 lb. platform scale 5'x6'.

Miscellaneous items: File cabinets, metal chairs, air conditioner, straw conveyors, steam engines, boilers. 2 Dillon Jordans.

Equipment to be sold as a unit or in parts—Inspection can be made on the premises at Vincennes, Indiana.

FRANK H. DAVIS COMPANY, INC., P. O. Box 231

Cambridge 39, Mass. Telephone TR 6-0365-6-7

M-1

Modern Methods of Mechanical Pulp Manufacture

This book comprehensively covers all aspects of groundwood pulp production. The author K. H. Klemm, has a broad knowledge of groundwood manufacturing methods and has been associated with groundwood mills on both sides of the Atlantic. Price: $5.00.

CONTENTS

The Raw Material: Wood

Heterogeneity of Wood 8
Effect of Pulpwood Quality 17
Pulpwood Transportation to the Mill and Wood Storage Methods 27
Wood Handling Within the Mill 33
Removing the Bark from Pulpwood 38
Barking Methods and Bark Disposal 45
Modern Woodyard Systems 56

The Groundwood Mill

Theoretical Aspects of Production 63
Factors Influencing Grinder Capacity 71
Modern Grinder Types 75
Stones and Stone Handling 87
Grinder Drives and Governors 97
Coarse Screening and Rejects Recovery 102
Grinder Room Arrangement 106
Mill Manpower Requirements 108
Problems of Groundwood Quality 111
Routine Testing and Control Methods 114
Instrumentation in a Groundwood Mill 121
Grinder Control 125
Control and Record Keeping 138

Groundwood Stock Preparation

White Water Systems 144
Screening Methods and Principles 151
Modern Equipment for Screening 174
Theoretical Considerations of Screening Systems 183
Thickening 190
Bleaching 202
Stock Chest and Storage Systems 212
Fraction Mixing Process 217
Groundwood from Steamed Wood Blocks 220
Chemical Treatment Processes 223
Mechanical Pulp from Disk Refiners 229
Comparison of Groundwood Pulps 234

Closing Remarks

Economic Importance, Main Properties, and Uses of Groundwood 237

LOCKWOOD TRADE JOURNAL COMPANY, INC.

49 West 45th Street, New York 36, N. Y.

Rush me post-paid a copy of your book, MODERN METHODS OF MECHANICAL PULP MANUFACTURE at $5.00. Remittance herewith.

Name .....

Company .....

Address .....

City..... Zone..... State.....

ADVERTISERS

Acme Steel Company ..... —
Air Reduction Chem. Co. ..... —
Air Reduction Sales Co. ..... —
Albany Felt Co. 10A
Alginates Industries, Ltd. ..... —
Allied Chem. Corp., National Aniline Div. ..... —
Allied Chem. Corp., Solray Process Div. ..... —
Allmond, Ateliers de Construction ..... —
Allis Chalmers Mfg. Co. ..... —
American Bitumuls & Asphalt Co. ..... —
American Bridge Div., U. S. Steel Corp. ..... —
American Cyanamid Co.
Paper Chemical Div. ..... —
Dyes Dept. ..... —
Organic Chem. Div. ..... —
Pigment Div. ..... —
American Defibrator Co. ..... —
American S. F. Products ..... —
American Steel & Wire Co. ..... —
American Viscose Corp. ..... —
Ames Company Inc. 50
Anglo American Clays Corp. . 56
Anglo-Canadian Pulp & Paper Mills ..... —
Anglo Paper Products Ltd .. —
Anheuser-Busch, Inc. ..... —
Antara Chemicals, Sales Div. Gen. Aniline & Film Corp. . —
Apmew, Inc. 52
Appleton Machine Co. ..... —
Appleton Wire Works ..... —
Armco Drainage & Metal Prod. Co. ..... —
Armco Steel Corp. .....40 & 41
Arnold Hoffman & Co. 54
Asten-Hill Mfg. Co. ....Cover 2
Atlantic Coast Line R. R. 38
Babcock & Wilcox Co. ..... —
Bahr Brothers Mfg. Co. ..... —
Bailey Meter Co. ..... —
Bauer Bros. Co. ..... —
Becco Chem. Div. Food Machy. Corp. ..... —
Beloit-Eastern Corp. 18A
Beloit Iron Works Co. ..... —
B. I. F. Industries ..... —
Bird Machine Co. 15
Bixby, R. W. Inc. ..... —
Black-Clawson Co. ..... —
Black-Clawson Int., Ltd. ..... —
Bolton & Sons 3
Brandon Sales, Inc. ..... —
Broughton, A. E. & Co. 10
Brown Company ..... —
Bruderhaus (Maschinenfabrik Zum) ..... —
Buckeye Cellulose Corp. ..... —
Buffalo Forge Co. ..... —
Buffalo Pumps 43
Butterworth, H. W. & Sons Co. —
Cady, E. J. & Co. 44
Cadillac Associates Inc. ..... —
Cameron Machine Co. 53
Carthage Machine Co. ..... —
Celgar Ltd. ..... —
Celleco, A. B. ..... —
Cellulose Development Corp. .... —
Central Soya Co. ..... —
Cesalpina S.P.A. ..... —
Chemico ..... —
Ciba Company ..... —
Clark-Aiken Company ..... —
Classified Advertising 57
Cleveland Crane & Engrg. ..... —
Columbia-Geneva Steel Div., U. S. Steel Corp. ..... —
Columbia Southern Chemicals (refer to Pittsburgh Plate Glass Co., Chem. Div.) .... —
Combustion Engrg. Co. 10B
Corn Products Sales Co. ..... —
Crane Company ..... —
Curtiss-Wright Corp. ..... —
Davis, Frank H., Co. Inc. 60 & 61
Dewey & Almy Chem. Div. W. R. Grace Co. ..... —
DeZurik Corporation ..... —
Diamond Alkali Co. ..... —
Dixon Chem. & Res. Co. .... —
Dobeckmun Company ..... —
Dodge Mfg. Co. ..... —
Dorries, O., A. G. 6
Dorr-Oliver ..... —
Dow Chemical Co. .....36 & 37
Dow Corning Corp. ..... —
Draper Bros. Co. 54
Dryden Paper Co., Ltd. ..... —
du Pont, E. I. de Nemours & Co., Dyes & Chem. Dept. .....50C & 50D
Electrochemical Dept. ..... —
Pigments Dept. ..... —
Duverre Inc. ..... —
Eaton Manufacturing Co. .... —
Ebasco Services, Inc. ..... —
Economy Equipment Co. ..... —
Egan, Frank W., & Co. ..... —
Egger, Emile & Co. ..... —
Electric Mchy. Mfg. Co. ..... —
Elixman Paper Core Co. 55
Escher Wyss G.m.b.H. ..... —
Evans, W. P. & Son, Ltd. .. —
Export Supplement ..... —
Fabri Valve Co. of America .. —
Farrel-Birmingham Co. 17
Fibre Making Processes Inc. .. —
Finckh, Herman ..... —
Fitchburg Screen Plate Co. ... —
Food Mchy. & Chem. Sales Dept., Chemicals & Plastics Div. ..... —
Food Mchy. & Chem. Corp. Chlor-Alkali Div. ..... —
Foxboro Co. ..... —
Freeport Sulphur Co. ..... —
Freeman, J. A., & Son 18
Garlock, Inc. ..... —
Gaspesia Sulphite Co. Ltd. ... —
Gates Rubber Co. ..... —
Geigy Chemicals Corp., Geigy Dyestuffs Co. ..... —
General Dyestuffs Co. 9
General Tire & Rubber Co. ... —
Gibbs-Brower Co. 57
Gilbert & Nash Co. ..... —
Glidden Company ..... —
Goodyear Tire and Rubber Co. —
Gottesman-Central National Org. —
Goulds Pumps ..... —
Great Eastern Packing & Paper Co. 46
Great Lakes Carbon Corp., Dicalite Dept. ..... —
Green, Inc., Frank B. ..... —
Greening & Sons, Ltd. ..... —
Grinnell Co., The ..... —
Gurley, W. & L. E. ..... —
Hamblet Machine Co. ..... —
Harbison Walker Refactories .. —
Hardinge Company, Inc. ..... —
Harland Eng. Ltd. ..... —
Harris-Seybold 19
Hayssen Mfg. Company ..... —
Heimbach, Thomas J. ..... —
Hercules Powder Co. ..... —
Hooker Chemical Co. ..... —
Huber, J. M. Corp. ..... —
Hudson Sharp Machine Co. .. 39
Hungerford & Terry, Inc. 54
Hunt, Rodney ..... —
Hunt & Moscrop ..... —
Huyck Felt Company ..... —
Hyster Company ..... —
Improved Machinery, Inc. .... —
Ingersoll-Rand Co. ..... —
Inglis, John, Co. ..... —
Industriplanering ..... —
Jagenberg U.S.A., Inc. 51
Jagenberg Werke ..... —
Jamesbury Corp. ..... —
Jenkins Brothers ..... —
Johnson, Alvin H., Co. ..... —
Johnson Corp., The ..... —
Jones, E. D., Corp. 50A & 50B
Kalamazoo Tank & Silo Co. ... —
Kamyr, Inc. ..... —
Karlstads Mekaniska Werkstad . —
Kellogg, M. W. Company ..... —
Kenyon, James & Son ..... —
Kidder Press Co. ..... —
Knox Woolen Co. ..... —
Koppers Co., Inc. ..... —
Krauss-Maffei-Imperial G.m.b.h. ..... —
Lamb-Grays Harbor Co. ..... —
Lamort Fils ..... —
Langston, Samuel Co. ..... —
La Papeterie ..... —
Laporte Titanium Ltd. ..... —
Leje & Thurne, A. B. ..... —
Lestoil, Inc. ..... —
L'Homargy ..... —
Link-Belt Co. ..... —
Lob, Albert Maschinen und Apparatebau ..... —
Lodding Engineering Co. 44
Lukon, Inc. ..... —
Lunkenheimer Co. ..... —
Lyddon & Co. ..... —
Main, Charles T., Inc. ..... —
Manchester Machine Co. ..... —
Marathon—A Division of American Can ..... —
McLean, Ltd. ..... —
Mead Pulp Sales, Inc. ..... —
Mecke, Klaus, & Co. ..... —
Metron Instrument Co. ..... —
Miehle-Goss-Dexter ..... —
Miller Corp., Harry ..... —
Millspaugh, Ltd. ..... —
Mine and Smelter Supply Co. .. —
Minerals & Chem. Philipp Corp. ..... —
Minneapolis-Honeywell ..... —
Mixing Equipment Co. ..... —
Monsanto Chemical Co. ..... —
Montmorency Paper Co., Inc. —
Moore & White ..... —
Morden Machine Co. 54
Mt. Vernon Mills, Inc. ..... —
Multi-Amp Electronic Corp. ... —
Multi Metal Wire Cloth Co. ... —
Murray, D. J., Mfg. Co. ..... —
Nalco Chemical Co. ..... —
Nash Engineering Co. ..... —
National Aniline Div., Allied Chem. Corp. ..... —
National Starch & Chemical Corp. ..... —
National Tube Div., U. S. Steel Inc. ..... —
Newport News Shipbldg. & Dry Dock Co. ..... —
New Jersey Zinc Co. ..... —
Nichols Eng. & Research Corp. ..... —
Nopco Chemical Co. ..... —
Norton Co. ..... —
Oakite Products Inc. 53
Olin Mathieson 18B
Osborne Paper Mill Equip. Co. —
Overly's Inc. ..... —
Paper Conv. Mch. Co. ..... —
Parsons & Whittemore ..... —
Patton Mfg. Co. ..... —
Penick & Ford ..... —
Penn. Ind. Chem. Corp. ..... —
Penobscot Chemical Fibre Co. . —
Pennsalt Chem. Corp. ..... —
Perkins Goodwin Co. ..... —
Pfaudler Permutit Inc., Permutit Div. ..... —
Personnel Service Assoc. 58
Pioneer Paper Stock Co. .... —
Pittsburgh Plate Glass Co., Chem. Div. ..... —
Potdevin Machine Co. 56
Powell Valves ..... —
Price & Pierce, Ltd. ..... —
Puget Sound Pulp & Timber ... —
Rauma Repola Oy ..... —
Raymond, Charles P., Service —
Rayonier, Inc. ..... —
RCA Industrial Electron Prod. —
Record Fdy. & Mach. Co. .... —
Red Ray Mfg. Co. ..... —
Rhoads, J. E., & Sons ..... —
Rice Barton Corp. ..... —
Riedel, Gus & Son ..... —
Riegel Paper Corp. ..... —
Robbins Instrument Co. ..... —
Rockwood Sprinkler Co. ..... —
Rohm & Haas Co. ..... —
Ronningen-Petter Co. ..... —
Roosevelt Paper Co. ..... —
Rosenblads Patenter, R. B. ..... —
Ross, J. J. Co. ..... —
Ross, J. O., Engrg. Co. ..... —
Ross Midwest Fulton Corp. .. —
Ross Paper Machinery Co. . . 59
Ruderman Machinery Service . 60
Rust Engineering Co. ..... —
Sandoz Chem. Wks. ..... —
Sandy Hill Iron & Brass Wks. 49
Scapa Dryers ..... —
Seaboard Air Line R. R. Co. . —
Shawinigan Resins Corp. .... —
Sheffield Corp. ..... —
Shuler & Benninghofen ..... —
Signode Steel Strapping Co. ..... —
Sinclair Company ..... —
Sirrine, J. E., Co. ..Front Cover
Smidth, F. L., & Co. ..... —
Smith & Winchester Mfg. Co. .. —
Sonoco Products Co. ..... —
Southworth Machine Co. ..... —
Spraying Systems Co. 56
Sprout Waldron & Co. 10
Stadler Hurter & Co. ..... —
Staley Mfg. Company ..... —
Starch Products, Ltd. ..... —
Stebbins Engrg. Co. 52
Stein, Hall & Co. ..... —
Steinen, Wm., Mfg. Co. 55
Stevens, Inc., Charles R. .... —
Stone & Webster Eng. Corp. . 55
Stowe-Woodward, Inc. ..... —
St Regis Paper Co., Kraft Div. ..... —
St. Regis Paper Co., Panelyte Div. ..... —
Sturge Ltd., John & E. ..... —
Sulzer Brothers ..... —
Sunday, George M., Assoc. .. 57
Taylor Instrument Co.'s ..... —
Taylor-Wharton Company .... —
Tennessee Corp. ..... —
Texaco, Inc. ..... —
Texas Gulf Sulphur ..... —
Thermal Equip. Corp. ..... —
Thiele Kaolin Co. ..... —
Thiry & Company ..... —
Thomas Paper Stock Co. 56
Thompson, John, Co. ..... —
Titanium Pigment Corp. ..... —
Torrington Co. ..... —
Tyer Rubber Corp. ..... —
United Engrg. & Fdy. Co. Cover 3
Universal Metal Hose Co. .... —
U. S. Industrial Chem. Co. Div. of National Distillers & Chem. Corp. ..... —
U. S. Steel Corp. ..... —
United States Steel Export .. —
United States Steel Supply Co. —
Valley Iron Works ..... —
Vanderbilt, R. T., Co. ..... —
Vapo Systems Co. ..... —
Virginia Smelting Co. Back Cover
Voith, J. M., G.m.b.H. ..... —
Waldron-Hartig Div., Midland Ross Corp. ..... —
Wallingford Steel Co. ..... —
Walworth Co. ..... —
Wartsila Koncernen A. B. .... —
West End Chemical Div., Stauffer Chem. Co. ..... —
West Va. Pulp & Paper Co. ... —
Weyerhaeuser Co. ..... —
Williams-Gray Co. ..... —
Wisconsin Wire Works ..... —
Woodpulp, Inc. ..... —
Wyandotte Chem. Corp. ..... —

While we strive for accuracy in preparing the above index which is purely a service to our readers, we cannot be responsible for errors

PAPER TRADE JOURNAL

BUSINESS STAFF

Arthur E. Gordon, Business Mgr.
Francis J. Gordon — Alrick Man
Edward H. Hall — Pittsburgh-Cleveland Area
New York 36, N. Y. 49 W. 45th St. Plaza 7-2370
Cable: "Lockmin"

CHICAGO 3, ILL.: H. K. Vinton
79 W. Monroe St. CEntral 6-2784

MIAMI 38, FLA.: Hal Moore
279 N. E. 79th Street. PLaza 8-5516

Rep. by McDonald-Thompson in:

LOS ANGELES 5, CAL.: R. Teeter
3727 W. Sixth St., DUnkirk 7-5391

SAN FRANCISCO, CAL.: Cal Wood
625 Market St. EXbrook 7-5377

DENVER 3, COLO.: Bob Heidersbach
620 Sherman Street. TAbor 5-3325

PORTLAND 1, ORE.: Francis M. Eaton
2035 S.W. 58th Ave., CA 2-5146

DALLAS 19, TEXAS: Parker Harris
2727 Oak Lawn Ave., LAkeside 1-1266

HOUSTON 6, TEXAS: F. Vickrey
Room 214, 3217 Montrose Blvd. JAckson 9-6711

SEATTLE 4, WASH.: H. Abney
1008 Western Ave. MA 3-3766

Frederick B. Grosse, Production Mgr
New York 36, N. Y. 49 W. 45th St. Plaza 7-2370
Cable: "Lockmin"

Foreign Representatives

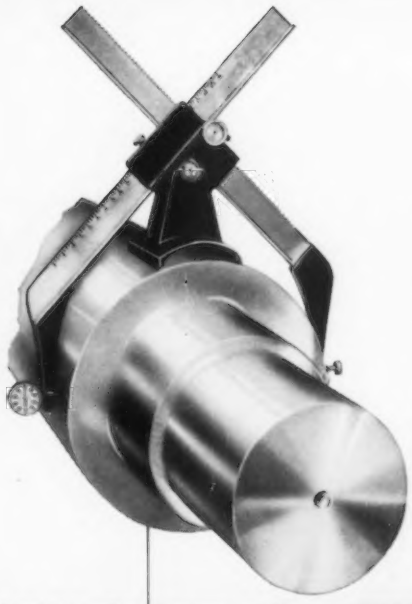
EUROPE except U.K. & Germany
John Ashcraft
67 Avenue des Champs Elysees, Paris, 8.

GERMANY
Herbert Morgenbesser
Kohlgarten, 3, Hamburg-FU. Phone 59-82-03.

TOKYO, JAPAN
George C. Olcott, Business Manager,
International Media Representatives Ltd.,
Shadan Hojin, 14.2—Chome Marunouchi.

UNITED KINGDOM
John Eckford-Prossor,
Strafford House, Norfolk St., Strand, London, W.C.2.
Phone TEmple Bar 7397.

HUGHES PRINTING CO.
EAST STROUDSBURG, PA.

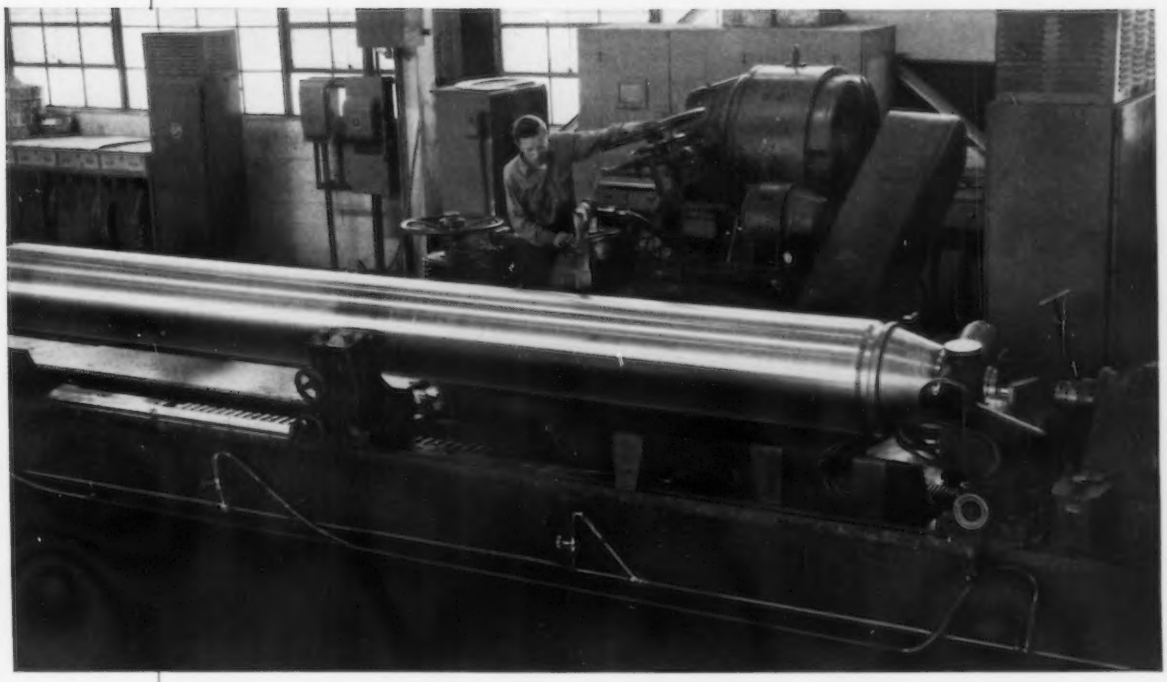


UNITED®

CHILLED IRON AND ALLOY CHILLED IRON

ROLLS

FOR PAPER AND ALLIED INDUSTRIES



- CHILLED IRON ROLLS
- MACHINE CALENDER STACKS
- ROLL GRINDING MACHINES
- ROLL CALIPERS
- KNIFE GRINDERS

* Light weight United Micrometer Roll Caliper. Micrometer dial graduated in thousandths. The most accurate saddle-type caliper in use today.

UNITED FURNISHES THE LONGEST AND HEAVIEST ROLLS required by the paper industry. United Chilled Iron Rolls for machine calendering give longer service; are uniformly hard and highly resistant to abrasion and deformation. For water finish or high pressure stocks, United rolls of special alloys are available.

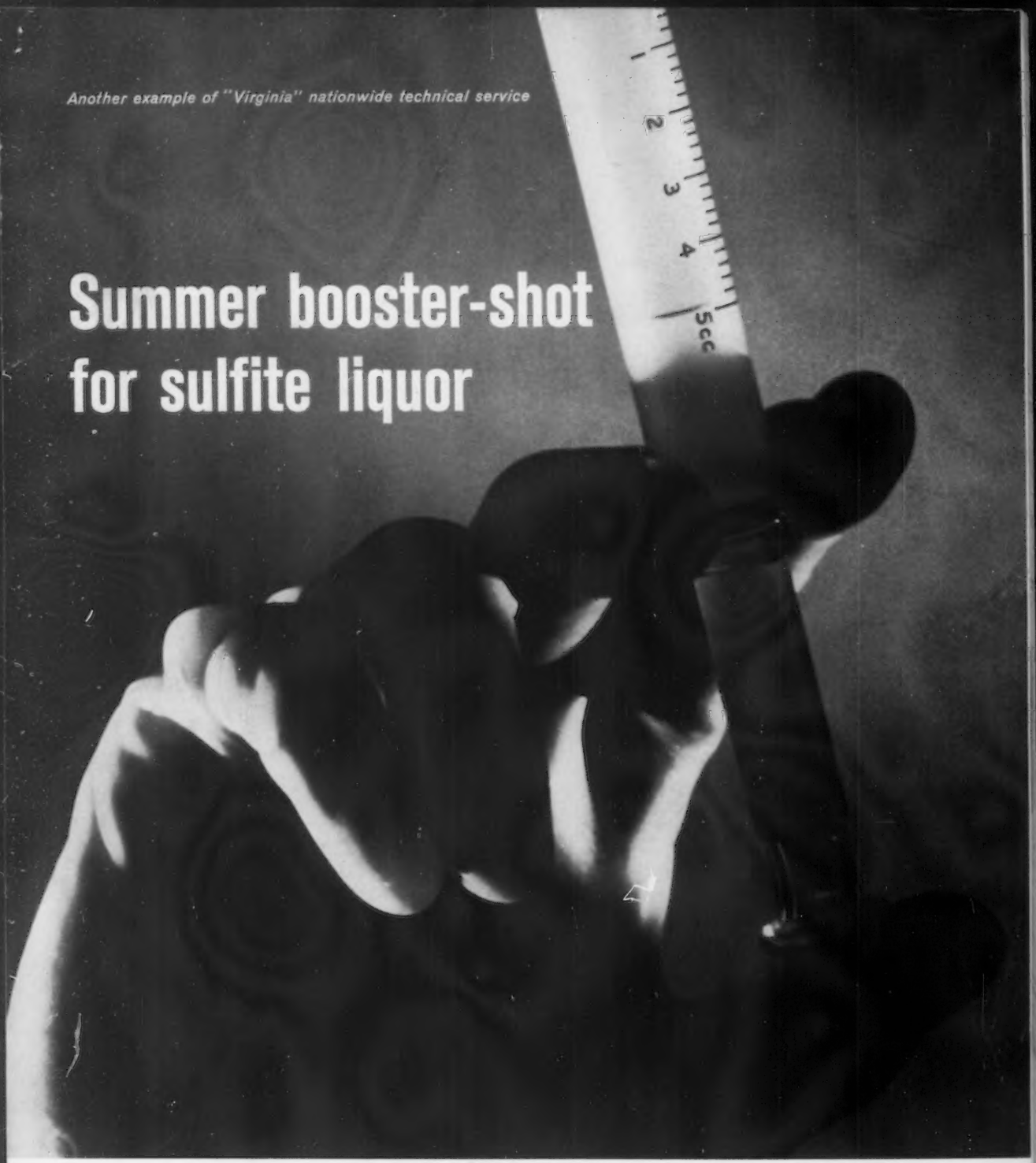
UNITED

ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH 22, PENNSYLVANIA

Another example of "Virginia" nationwide technical service

Summer booster-shot for sulfite liquor



A pulp mill was plagued year after year by an efficiency loss of about 30% in the sulfite acid-making plant caused by summer-warmed water. As a result, both pulping capacity and pulp quality dropped off. The mill people decided to try refortifying their sulfite cooking acid and ordered a tank car of Virginia SO_2 (99.9% pure). We sent a technical service man along. He found best results were obtained by adding liquid SO_2 to the sulfite acid storage tank through an open stainless steel pipe. Strength of the cooking acid was quickly raised to the required 6.5% level. Pleased with the results of this summer-time emergency treatment, the mill took a hard look at year-round variations in acid strength and pulp quality—now plans a permanent installation that will permit efficient use of liquid SO_2 as needed throughout the year. This will assure constant-strength sulfite liquor, a higher yield from the digesters, and a better end product. If your sulfite liquor needs a summer booster shot, write us for data. Industrial Division, VIRGINIA SMELTING COMPANY, Dept. 219, West Norfolk, Va.

VIRGINIA *Chemicals*

Field Offices: New York • Boston • Chicago • Atlanta
Asheville • Philadelphia • Akron • Seattle • Memphis

Available in Canada and many other countries